The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Millions for Chemical Workers

WE publish this week a second letter from Mr. A. J. Gillian, the general secretary of the Drug and Chemical Union. It is pleasant to hear from so high an authority that we have now "resumed to" our hitherto high standard of something or other. We might derive some little entertainment from pursuing our correspondent's views on such matters, but our simple concern is still to bring Mr. Gillian out of his cloudy platitudes and confront him with facts.

What we first drew attention to was Mr. Gillian's flaming talk about those wicked millions of chemical profits for non-producing stockholders; and his assertion that "the workers foolishly do all the giving and the shareholders all the taking." When we asked him what the workers did give towards the creation of chemical industry, he replied, just as they do in the talkies—their brains, their brawn, and occasionally their lives. Mr. Gillian is wrong. The chemical worker no more "gives" his services to the employer than the village grocer "gives" a lb. of butter to his customer. He sells them at so much an hour or week. Mr. Gillian should know this quite well, for his own workers' organ gives an estimate of what Imperial Chemical Industries pays every week in wages. The statement he publishes estimates the number of people employed by I.C.I. at 50,000, and puts their average wage at £2 10s. per week. This estimate, we fancy, is far below the mark, but even so it will serve to test Mr. Gillian's assertion. To pay 50,000 people £2 10s. each involves an expenditure of £125,000—for one week alone. There are 52 weeks in the year, and £125,000, multiplied by 52, comes to £6,500,000. So that, taking his own figures, instead of shouting about those colossal nett profits of £4,473,392 for non-producing stockholders, earned entirely, of course, by the down-trodden workers, Mr. Gillian should really have been shouting that the colossal sum of £6,500,000 had gone into the pockets of the workers, who had thus got over two millions more of the profits than all the stockholders put together, and in addition had got their share first. Not at all bad, we should say, for the people who do "all the giving!"

Last week when pleasantly twitted for his neglect to pick up those easy chemical millions by starting works himself, he retorted that he had a simpler solution—that the State should forthwith take over Imperial Chemical Industries. Now "forthwith" means at once, immediately, without a moment's delay. So we asked him to state plainly what he meant by "taking over." It is a little disappointing to find he hasn't the foggiest idea. "How industries are to be taken over," he says, in his airy way, "is to me not material—the end will justify the means." Did he suggest confiscation, we asked. Mr. Gillian doesn't know, apparently has never thought about it, doesn't want to be bothered with it. He turns helplessly and quotes Mr. Winston Churchill, of all people, on nationalisation! In referring to stockholders he still continues to distinguish between the small investor and those who hold what he calls "blocks" of shares. We can imagine that it sounds very knowing to refer mysteriously to those large "bl-l-locks" of shares and that it conveys something very sinister to the simple listener outside the works gates. But anyone with an elementary knowledge of the subject knows that 10 shares is as much a "block" as a thousand, and that banks and insurance companies, acting as executors and trustees for hundreds of thousands, rich and poor alike, necessarily handle large sums on behalf of their customers. The richer trade unions, which have invested funds, hold "blocks" of shares in exactly the same way. If the Chemical Worker's Union ever becomes a rich corporation—dreadful as the thought must be—it will have to invest its money somewhere or other in "blocks," and will expect regular interest on it just like the wicked stockholder in any chemical company. And if the union's funds should ever be lost or confiscated, well, it is not material to Mr. Gillian—the end will justify the means!

The Importance of the "Lab."

THOUGH the laboratory is the least conspicuous of the essential stages in chemical industry, it is the first in order and not far from the first in importance. For chemical industry begins with the theories worked out by the laboratory chemist, and all the complicated organisation that follows merely serves to give industrial effect to the original discoveries. It may still be true that the laboratory even now is not recognised at its full value; but it is equally true to say that it was never so generally and so highly valued as to-day. Within the lifetime of the CHEMICAL AGE, which dates from the end of the war, there has been a remarkable increase in the chemical research organisations established by the Government: by industries working under the Department of Scientific and Industrial Research, by municipal and public authorities, and by private firms and companies. Industry has thus been brought into much more direct contact with the chemist, and has benefited not only by chemical discovery but also by chemical control, chemical sampling, and many other operations.

With this development of laboratory work, there has been a natural demand for better physical accommodation and for better apparatus and equipment. The early masters of chemistry had to work with very simple tools. No one can glance at the apparatus used, for example, by such a master as Faraday without wondering at the results achieved with such limited means and without also comparing the crude appliances, often made by the worker himself, with the finished apparatus available for workers of even limited means to-day.

In this issue we give notices of many types of laboratory furnishings and apparatus at the service of the laboratory director and worker. They are designed to secure cleanliness, safety, economy of time, the most delicate accuracy, and the elimination of all guess work. All this is of untold advantage to the investigator in whatever field he may be working. And it is satisfactory to find that English workers have now an ample choice of English chemical laboratory apparatus as they have of English chemicals and chemical plant. With the progress of chemical manufacture at home, we have developed the habit of depending on home supplies for our equipment, and no laboratory director to-day ought to think of ordering foreign equipment untll at least he has made sure that the home supply is not equal to his need. Perhaps there is still something of the old habit left; but it is all but gone, and every effort should be made to encourage the new habit of buying, wherever it is possible, British productions from British houses.

National Economy Campaign

THE national campaign for public economy was carried an important stage further on Wednesday, when two of the leading members of the Friends of Economy, Sir Hugh Bell and Sir Ernest Benn, spoke on the economy movement at the House of Commons. The meeting was arranged for members by three of their number, each of whom represented one of the three parties—Mr. Josiah Wedgwood, Sir Dennis Herbert, and Mr. Leif Jones. The importance of this meeting should not be underestimated, for if once Parliament begins to give practical effect to frequently expressed sentiments in favour of economy, real retrenchment may be in sight.

Demonstrations for economy were held at three important centres last week. At Wigan there was an impressive attendance. Crowded meetings and keen interest have been a striking characteristic of all the meetings in the hard-hit industrial areas. At Liverpool, where Lord Hailsham was a leading speaker, and at Birmingham, where Sir Gilbert Vyle took the chair, large gatherings of citizens gave emphatic expression to their insistence on a halt in Governmental expenditure. Sir Ernest Benn spoke at each of the three meetings.

Moving a vote of thanks to Dean Inge, who gave an address on Russia at the Individualist Luncheon in London last week, Sir Ernest Graham-Little, M.P., said the Friends of Economy had had a remarkable degree of success. He was quite convinced that a Member of Parliament who took his courage in both hands, and explained to his constituents that economy was as necessary to the nation as a surgical operation might be to a patient dangerously ill, would not suffer but would receive wide support for his patriotic effort.

Book Received

ORGANIC SYNTHESES. Edited by Carl S. Marvel. London: Chapman and Hall, Ltd. Pp. 106. 8s. 6d.

The Calendar

Apr. 29	Royal Society of Arts: "Stainless Metals." Professor Sir Harold Carpenter. 8 p.m.	John Street, Adelphi, London
29	British Chemical and Dyestuffs Traders' Association: Annual General Meeting. 2.30 p.m.	London.
29	Institute of Fuel: Visit to Corporation Electricity Works and the International Combustion Co.'s Works, Derby.	Derby.
May 1	Ceramic Society (Building Materials Section); Spring Meeting.	Royal School of Mines, London
1	Physical Society. 5 p.m.	Imperial College of Science, London.
4	Society of Chemical Industry (London Section): "The Chemical Constitution of Coal." Professor W. A. Bone. 8 p.m.	Burlington House, Piccadilly, London.
6	Institute of Metals: Annual May Lecture—"The Progress of Power Production." W. B. Woodhouse. 8 p.m.	Institution of Mechanical Engineers, Storey's Gate, London.
6	Society of Public Analysts. 8 p.m.	Burlington House, Piccadilly, London.
7–8	Iron and Steel Institute: Annual Meeting.	Institution of Civil Engineers, Great George Street, London.
7	Iron and Steel Institute: Annual Dinner. 7 p.m.	Connaught Rooms, Great Queen Street, London.
7	Chemical Society. 8 p.m.	Burlington House, Piccadilly, London.
12	Institution of Petroleum Technologists. 5.30 p.m.	John Street, Adelphi, London.
13	Electroplaters' and Depositors' Technical Society: "Problems in Chromium Plating and High Current Density Nickel Plating." N. R. Laban. 8.15 p.m.	Northampton Polytechnic Institute, London.
14	Optical Society: Annual General Meeting. 7.30 p.m.	Imperial College of Science, London.
15	Institute of Chemistry (Belfast Section): Annual General Meeting. 7.30 p.m.	Royal Belfast Academical Institution, Belfast.

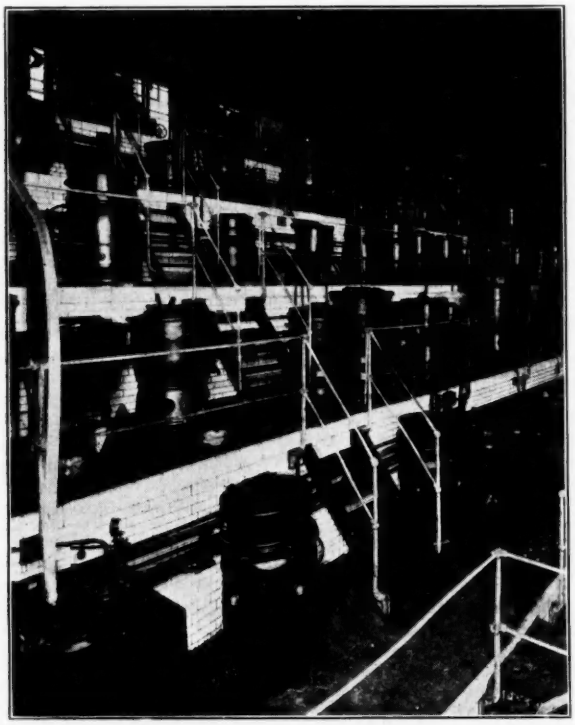
The Acton Precious Metals Refinery

Modern Refining Processes for Platinum and the Platinum Metals

On Thursday, April 23, the new extensions to the Precious Metals Refinery of the Mond Nickel Co., at Acton, were formally opened. Lord Weir presided at the opening ceremony, which was followed by a luncheon. Many distinguished guests were present, including the Rt. Hon. J. H. Thomas, Secretary of State for the Dominions, and the Hon. G. H. Ferguson, High Commissioner for the Dominion of Canada, which is the chief country of origin of the materials which are to be treated.

Origin of the Acton Refinery

The presence of relatively large quantities of platinum metals in the Canadian ores has been realised for many years, and when the carbonyl process for the extraction of nickel was first introduced, at Clydach, by the Mond Nickel Co., some thirty years ago, steps were taken to recover these metals from the rich concentrates produced. In the early days these concentrates were sent to independent refineries for treatment, but later, when the production of nickel had become sufficiently large, the development of a special process and the construction of a special plant for the recovery of platinum metals became economically possible. The methods of refining thus initiated, eventually formed the basis of the operations conducted in the refinery which was built at Acton in 1924.



Wet Process Building showing terraced arrangement of Treatment Vessels.

Later, in addition to the concentrates from the carbonyl process, crude platinum from South Africa was also treated. More recently still, since the fusion of the interests of the International Nickel Co., Inc., and the Mond Nickel Co., Ltd. (to form the International Nickel Co. of Canada, Ltd.) the treatment of concentrates from the electrolytic nickel refinery at Port Colborne, in Ontario, has also been undertaken at Acton. The opening up of the enormous deposits in the Frood Mine was another event which greatly increased the company's resources of precious metals, and called for increased capacity at the precious metals refinery.

The original refinery, and the subsequent additions which embody the results of experience in the refining of precious metals, have been planned by the technical staff of the Mond Nickel Co., Ltd. Although designed to handle concentrates from the carbonyl process, averaging 4 per cent. of platinum metals, the original plant has proved to be quite flexible and, apart from the refining undertaken for other interests, it is now dealing efficiently with much richer concentrates from Clydach, and with those from Port Colborne, containing as much as 50 per cent. of platinum metals.

Features of the Plant

The metallurgical equipment of this refinery is built on a much smaller scale and is more diversified than that found in the average heavy metallurgical works. Smelting and cupellation are carried out in small basic-lined tilting furnaces of novel design. One of our illustrations shows the pouring of a charge from one of these oil-fired furnaces. Here, it is interesting to observe that the plant employed for collecting and scrubbing the fumes from the furnaces, which is necessary in order to comply with the lead process regulations, simultaneously recovers more than enough precious metals to pay for this operation.

The equipment for the wet process buildings, which is also illustrated, is arranged on a series of terraces constructed in acid proof materials. This arrangement permits the gravity flow of the liquors and materially reduces labour and supervision. Good lighting and ventilation are provided, and fumes from the reaction vessels are removed by plant operating on the induced draught principle.

The nature of the liquors treated limits the choice of materials for plant construction. Chemical stoneware, vitreosil, porcelain, glass, hard and soft rubber, chemical asphalt and lead are employed, while wood and iron vessels, suitably lined, are also used where practicable. The usual supply services of water, steam, electricity, gas, vacuum and compressed air are laid on throughout the building and an overhead crane is provided to facilitate the removal or replacement of plant when occasion arises.

The Refining Process

When it is realised that in this process seven distinct metals have to be separated, not only from each other, but also from fifteen accompanying base metals, it will be clear that the treatment of the concentrates from the nickel refineries is an elaborate process and must involve special methods.

The Clydach concentrate, containing a relatively large proportion of silver and lead, receives an initial smelting operation, in the course of which lead is used as a collector of the precious metals. Subsequent cupellation removes the excess of lead (which is used again in further smelting charges) and a silver-rich precious metals alloy remains. This alloy, which is four times as rich as the original concentrate, is then parted with sulphuric acid, this being a cheaper process than the use of nitric acid, which must be employed for parting alloys rich in lead. Subsequent aqua regia treatment dissolves most of the platinum, palladium and gold. Platinum is then precipitated as ammonium platinichloride, which, on ignition, yields pure platinum sponge. Palladium, on the other hand, is precipitated as palladosammine chloride, and similarly yields palladium sponge.

Both the silver and gold are ultimately purified by electrolysis, the methods adopted being particularly selected for the recovery of any trace of platinum metals and for the elimination of any trace of base metals.

The final insolubles and reduction residues from this wet process treatment are remelted to concentrate the rhodium, ruthenium and iridium, which are present in the original concentrate to the extent of only 0·4 per cent. The precious metal alloy thus obtained is then returned for wet process treatment and final purification in a special department.

Purity and Costs of Recovery

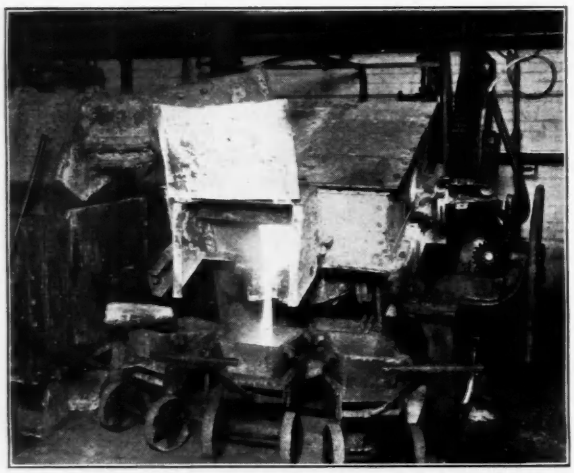
In order that synthetic alloys made from these precious metals may have constant physical and chemical properties, it is important that the metals should have a high initial degree of purity. In the case of platinum, the average purity of the metal is 99·93 per cent.; for palladium it is 99·94 per cent;, iridium, 99·7 per cent.; rhodium, 99·7 per cent.; ruthenium.

99·7 per cent.; gold, 99·97 per cent.; and silver, 99·97 per cent. Considered in relation to the high recovery which is effected these figures are all the more striking.

In the treatment of precious metals, supervision and standing charges are relatively high, so that the ultimate costs of refining are greatly influenced by the scale of operations. As carried out on the present scale at Acton, the cost of refining platinum metals works out at about ten shillings per ounce, without any appreciable increase in the cost of producing the base metals, nickel and copper. In practice, not more than 0·5 per cent. of the platinum metals contained in the concentrates is lost, while 2·5 per cent. is temporarily retained in furnace slags which are returned to the nickel refinery for re-treatment. The remaining 97 per cent. is produced directly as refined metal. The losses occurring in the processes of extracting the nickel and copper are also very small and it is estimated that 90 per cent. of the precious metals contained in the ore is ultimately recovered.

The Platinum Metals

Brownrigg was the first to give a scientific description of platinum in 1750, although the existence of such a metal had been known since the sixteenth century. Wollaston discovered palladium and rhodium in 1804, and in the same



Oil-fired Smelting Furnace for Platinum Metal Concentrates.

year Smithson Tennant proved the existence in platinum residues of two new metals to which he gave the names osmium and iridium. Ruthenium, the sixth metal of the group, was discovered by Claus in 1845.

Platinum which is tin-white in colour, ductile and malleable, and takes a very high, permanent polish, does not readily oxidise and is unattacked by all acids except aqua regia. Palladium, on the other hand, is silvery in appearance, and does not tarnish in air, but it is easily soluble in aqua regia and concentrated nitric acid, although not readily attacked by other acids. The most interesting physical property of palladium is perhaps its great ability to occlude hydrogen, for when heated in this gas it absorbs and retains over 800 times its own volume, which is once again liberated when the metal is reheated in vacuo.

Of the remaining metals of the platinum group it may be mentioned that iridium, alloyed with platinum, gives an alloy which is useful for many technical applications on account of its hardness. Rhodium has high reflectivity; ruthenium possesses the property of hardening platinum and palladium; whilst osmium, of which only small quantities are produced at Acton, has a specific gravity higher than that of any other material, and also has the highest melting point.

Its pleasing appearance and freedom from tarnish, in conjunction with its comparative rarity, has brought platinum into wide use as a fashionable metal for jewellery. Its extremely high melting point and its immunity from attack by most chemical reagents has caused it to be employed widely in the manufacture of crucibles, dishes, spatulas, electrodes, wire and other laboratory equipment. In the form of an alloy with 10 to 25 per cent. of iridium, it is extensively used for contact points in magnetos, electrical control apparatus, power switches, thermostats, electric clocks and similar equipment, where absolute reliability is required. Other electrical uses include platinum and platinum-rhodium thermo-elements for high temperature work, and platinum resistors for electric furnaces operating at temperatures up to 1200° C. Platinum-gold or palladium-gold spinnerets are used in the viscose process for the manufacture of artificial silk, whilst in the form of pure foil, platinum itself is used in dentistry for the crowning of teeth and, as a platinum-gold alloy, for fine clasps and wires. In addition, there is also an important industrial use of platinum in spongy form as catalyst in the production of sulphuric acid by the contact process and of nitric acid by the oxidation of ammonia. In the latter case it has recently been found that a more efficient and long-lived catalyst is obtained by alloying rhodium with the platinum.

So far as palladium is concerned, there is the possibility that it may ultimately replace "white gold." It has the advantage of being untarnishable at normal temperatures and is more easily worked than "white gold." Another important outlet is in dental alloys, high palladium alloys being superior to gold and vulcanite for dental plates since the white alloy reflects the colour of the oral tissues and becomes practically invisible in the mouth.

When the new refinery at Acton is working at full capacity it is hoped to produce 300,000 ounces of platinum per annum, and with this production it is anticipated that the uses of the metal will be considerably extended, and that new uses will also be found for the rarer associated metals of the platinum group. The laboratories at Acton have been specially built for the purpose of research in connection with the platinum metals and every effort is to be made to give all possible assistance to those who are interested in the applications of these metals.

Standard Specification for Test Sieves

The British Engineering Standards Association have just issued a British Standard Specification for test sieves. The committee in preparing this specification have had before them the standard sieves of the Institution of Mining and Metallurgy, together with standard sieves employed by the U.S. Bureau of Standards. Particulars of these are given in an appendix to the specification. It has been considered advisable to divide the British Standard Test Sieves into three series:—

1. Fine mesh sieves made of woven wire cloth with a size of aperture ranging from ·0021 in. (300 mesh) to ·1320 in. (5 mesh).
2. Medium mesh sieves made from woven wire cloth with a size of aperture ranging from $\frac{1}{32}$ to $\frac{1}{2}$ in.
3. Coarse mesh sieves made from perforated metal plate with a size of aperture ranging from $\frac{1}{2}$ in. to 2 in.

The series of fine mesh sieves has a screening area varying from 35 to 44 per cent. It is based on a ratio of the fourth root of 2 between linear aperture measurements of consecutive sieves; whilst in the other two series the increments in size of aperture are simple fractions of an inch. Any individual user of the standard test sieves would not, of course, use the whole range of sieves, and the sizes of apertures of the fine mesh sieves are so arranged that they may be readily grouped into four complete series.

In order to simplify manufacture and thus reduce the cost of production, the Committee have considered it necessary to adopt mesh numbers commonly used, and to specify sizes of wire included in the standard wire gauge series, or intermediate sizes which are in common use. These restrictions have necessarily limited the choice of aperture dimensions and rendered the progression of the series of fine mesh sieves slightly less uniform than could have been secured if odd counts and wire sizes had been adopted.

The many uses to which test sieves are put are so varied that the Committee are unable to specify the material from which they are to be made. For ordinary purposes it is recommended that steel should be used for sizes coarser than 40 mesh and phosphor bronze for the finer meshes.

Copies of the new Specification (B.S.S. No. 410, 1931) can be obtained from the British Engineering Standards Association, Publications Department, 28, Victoria Street, London, S.W.1, price 2s. 2d. post free.

"Leading the Blind"

To the Editor of THE CHEMICAL AGE.

SIR,—I notice you return again with another "leader" to discuss my reply to your previous "friendly jolt" as you term it, but I am pleased to note, and others will also, that you resume to your journal's hitherto high standard of tolerant debate of opinions different to your own, thereby creating an exposition of differing views without manifestations of bad temper.

Two points only call for reply, if I may be permitted. Firstly, "What do I mean by taken over by the State"? In this you attempt—probably permissible from your point of view—to raise the usual scare to frighten timid and nervous old ladies of both sexes, of a possible confiscation of their interest or profit earning stocks, not omitting in such a contingency to use the "widows' mites" in stocks owned by workers to defend the big "blocks" of stocks held by the following, among others—[the writer mentions five banks holding £973,000, an insurance company holding £445,000, and three persons holding respectively £199,000, £52,000, and £34,000]. This method of argument is old and moth-eaten, and is brought into operation whenever the question of nationalisation is raised. State ownership of monopolies has in the course of years proved its value to the community in protecting it against plunder by vested interests, and also in creating co-ordinated order against competitive chaos.

In the case under discussion the question of greater efficiency may not arise so urgently—I.C.I. efficiency of management is unquestionably good. Chambers of commerce urged nationalisation of telephone service. The late Lord Melchett, whose business capacity will not be questioned, once stated, "A state department can perform its services with as great intelligence as a private concern." Mr. Churchill (solid defender of vested interests) discussing state ownership said "I should like to see the state undertaking functions particularly in services which are in the nature of monopolies."

How industries, in this case the I.C.I., are to be taken over is to me not material—the end will justify the means. When the nation decides to take over the I.C.I. or any other concern, it will determine the conditions and, knowing British outlook very well, confiscation need not keep anyone awake at nights. The T.U.C. stands for nationalisation of monopolies, with workers' participation in control and management of public services and industries. You might also note that its views on compensation or confiscation have not been publicly stated.

Your other point was in connection with "Chemists." Don't you worry about me not hearing of chemists, even if I did not specifically mention them. The chemist, when discussed by the industries' leaders, is usually considered among the "technicians," and in my reference to technicians, the chemist was included.—Faithfully yours,

ARTHUR J. GILLIAN,
Editor of *The Chemical Worker*,
Official Journal, Chemical Workers' Union.

[This letter with which the correspondence closes, is referred to in our editorial columns.—ED. *C.A.*]

Scientists to Visit Russia

To the Editor of THE CHEMICAL AGE.

SIR,—It is proposed to organise a tour of scientists to the U.S.S.R., and the first party will leave London Bridge by Soviet ship for Leningrad on July 18. The return fare will be £18 inclusive. The party will spend a total of 16 days in Russia—3 days in Leningrad, 5 days in Moscow, half a day in Nizhni-Novgorod, and 4 days on the river down to Stalingrad (if desired). The cost per day will be £1 per head inclusive, the balance of the days being spent in travelling. Meetings will be arranged which members of the party will be invited to address, and there will be excursions with guides to scientific insfitutions. The Soviet authorities are prepared to give this tour second category accommodation at third category prices. The accommodation will be comfortable, and persons will sleep three or four in a room. Those wishing to sleep two in a room will pay five shillings per day extra. In the first instance the party will consist of twenty-five persons. If there is a large demand for places, a second party will be made up of twenty-five; the Russian authorities are prepared to accommodate up to one hundred persons if necessary. A further party may be arranged, if sufficient names are received, to leave London about the second week of August, returning to London in time for the British Association meeting. The latest date for receiving applications is April 30. Applications and all inquiries should be addressed to the Secretary, Society for Cultural Relations, 1, Montague Street, London, W.C.1.—We are, etc.

P. CHALMERS MITCHELL.
JULIAN HUXLEY.
April 8. E. C. SPRIGGE, *Chairmen.*

Improved Process of Treating Fabrics

Simplification of Dyeing Operations

A SHORT paper on "An Improved Process of Treating Fabrics" was read by Mr. G. E. Holden before the Manchester Section of the Society of Dyers and Colourists on Friday, April 17.

Mr. Holden said that, in producing colour effects on "art" velveteen composed of cellulose-acetate pile on cotton backing, or grounds, it had hitherto been the custom to submit such fabrics to two separate operations of dyeing, one for the purpose of colouring the cotton portion and the other for the cellulose-acetate portion. The work had been simplified by accomplishing the like results in one simple operation of dyeing by previously treating the "art" velveteen fabric with a solution of regenerated cellulose (viscose) in caustic alkali.

In this way beautiful colour effects were obtainable without impairing the lustre of the material. It had been discovered that although cotton cellulose was insoluble in caustic alkali, it was possible to prepare a solution by dissolving regenerated cellulose (viscose) in caustic alkali, soda, or potash at from 8 to 12 per cent. strength. These concentrated cellulose solutions could be made available for printing by the addition of further quantities of regenerated cellulose so as to impart to the solutions the correct consistency for the printing without necessitating the employment of other thickening agents. These concentrated solutions might be applied without adversely affecting the lustre of the cellulose acetate.

The advantages of this invention were numerous, as it now became possible to produce a wide variety of novel colour-effects in a much simpler manner than was possible before, because by this process it was possible to use more freely a large number of the diazotisable substantive cotton dyestuffs for the production of self colours and particularly coloured and white discharge effects on this class of mixed fabric.

Trade Openings in Roumania

THE Commercial Secretary to His Majesty's Legation at Bucharest reports that he has received from the Central Licitations Office in Roumania a request for the names of British firms interested in tendering for the various supplies required by Roumanian Public Departments. Apparently the Central Licitations Office (O.C.L.) has under contemplation the compilation of lists of contractors in Roumania and other countries, which it is intended shall be recommended to all Roumanian Government Offices allowed under the Public Accountancy Law to hold restricted licitations. No indication has been afforded regarding the range of commodities which Roumanian Public Departments are accustomed to purchase, but British firms who wish to have their names included in these lists should communicate with the Central Licitations Office (O.C.L.), Ministerul De Finante, Cal Victoriei III, Bucharest, Roumania, specifying the goods which are handled.

Dyeing Trade Wages

AT a meeting in Bradford on Saturday, April 18, members of the Bradford branch of the employees' trade union discussed the recommendation of the Joint Dyers' Executive Committee that the proposed agreed settlement of the wages discussions, which had been arrived at in negotiation with the Allied Association of Bleachers, Dyers, Printers and Finishers, should be accepted. The meeting was well attended, and after a full discussion, an amendment was proposed that the suggested agreement should be rejected, but when the members voted there was practically a unanimous decision to accept the suggested agreement.

Laboratory Furnishing and Equipment

New Products and Improvements

Minor improvements so often affect the results which are obtained when the apparatus is in use, and should therefore be brought to the notice of possible users at the earliest opportunity. It is for this reason that we give, periodically, a review of apparatus which is of outstanding interest, with additional notes upon the more ordinary equipment which is essential in the furnishing of both chemical and physical laboratories.

Baird and Tatlock (London), Ltd.

To most readers of THE CHEMICAL AGE the name of Baird and Tatlock (London), Ltd., is already very familiar. This old established company may truly be described as complete laboratory furnishers who construct laboratories for research, education, analysis, or works control, and also supply fittings and apparatus for every branch of science. The activities of the company are best followed by a consideration of its numerous publications. Of these the four standard catalogues of scientific apparatus describe general apparatus and deal respectively with chemistry, physiology, biological sciences and physics. Annual supplements to these catalogues describe new and improved apparatus evolved during the year. The following items taken from the 1930 supplement may be given as interesting examples of recent developments :—

THE "NEW EMPIRE" ANALYTICAL BALANCE

(1) The "New Empire" analytical balance illustrated above is a British product designed and manufactured at the "B.T.L." scientific instrument works. It is a short beam balance to carry 200 grams, sensitive to 0·1 milligram, and at a price of £10 is undoubtedly one of the finest values obtainable in British-made analytical balances.

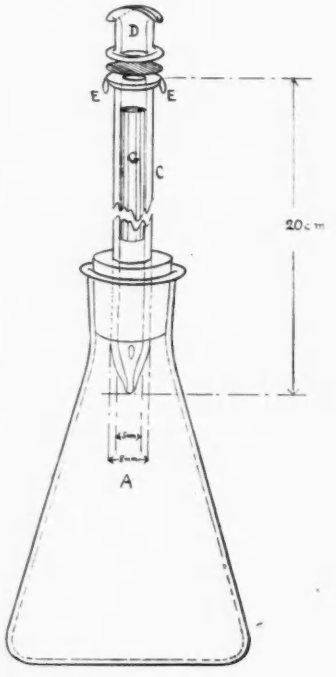
(2) The Gutseit method has lately gained in favour for the routine examination of foodstuffs and other materials for arsenic, but the older forms of the apparatus have always suffered from the defect that the mercuric chloride paper could not be secured so that all the gas evolved should pass through it. Under these circumstances uneven stains resulted, and it was never certain that the whole of the arsine was trapped. This difficulty was eventually solved in Baird and Tatlock's analytical laboratory by means of the ingenious device illustrated. Here the paper is held firmly by a glass cap, which is secured to the apparatus with a rubber band and even stains with no possibility of loss of arsine are obtained.

(3) The Whidbourne stroboscope is a light, compact instrument now finding manifold uses in the observation of moving machinery. The fact that the stroboscope does not require attachment to the object under observation has special advantages in laboratory work where light instruments rotate under so small a power that the attachment of another instrument would result in altering the speed considerably.

The 1930 supplement adds more than 600 items to the already extensive range of apparatus which is supplied by Baird and Tatlock, who are fully alive to the rapid advance in scientific methods and experimental technique which is characteristic of these times. Matters of technological interest, *e.g.*, the analysis of coal and its by-products; the determination of hydrogen-ion concentration; and the testing of oil, tar and bitumen are dealt with in special lists which contain not only full particulars and prices of the apparatus, but, in many cases, notes on its manipulation and thus form a useful supplement to existing text-books on the subjects.

One of the most recent B. and T. products is an automatic electrically-heated mercury still, which we illustrate below. The simplicity and robust design of this still obviates many disadvantageous features of the older types. The small amount of attention it requires recommends it for the extensive use it already has found both in laboratories and the workshops of electrical instrument manufacturers.

From the chemical section there is issued a catalogue enumerating some 3,000 substances, with special sections on microscopic stains, indicators, minerals, culture media, standard solutions, etc. The A.R. chemicals conform to the specifications given in *Analytical Reagents, Standards and Tests*, published jointly from the laboratories of Baird and Tatlock (London), Ltd., and Hopkin and Williams, Ltd. These specifications cover 180 chemicals as used in analysis and research and form by far the most up-to-date collection of its kind.



IMPROVED GUTSEIT APPARATUS

ELECTRICALLY-HEATED MERCURY STILL.

A recent innovation at Baird and Tatlock's premises is the equipment of a special laboratory for the preparation of the rarer organic chemicals. This department is continually adding to the number of chemical products made by the company.

Bennet Furnishing Co., Ltd.

LABORATORY benches and kindred fittings are supplied by The Bennet Furnishing Co., Ltd., 47, Glengall Road, Peckham, London, who also have showrooms at Glasgow and Belfast. Typical products of this firm are double working chemical benches, 12 ft. by 4½ ft. by 2 ft. 10 in.; single working chemical benches, 12 ft. by 2 ft. 3 in. by 2 ft. 10 in.; demonstration tables, 8 ft. by 3 ft. by 3 ft.; single chemical working benches, 12 ft. by 2 ft. 3 in. by 2 ft. 10 in.; fume chambers; apparatus cupboards; sinks and drainers. The company does its own plumbers', gas and water-fitters' work, as well as electrical equipment and wiring; the extraction of fumes and the supply of efficient fume chambers is also a special feature of their activities. They are now engaged upon the complete equipment for additional research laboratories at the experimental station of one of the large oil refining companies.

British Drug Houses, Ltd.

THE British Drug Houses, Ltd., are supplying an improved form of the Lovibond tintometer, specially suitable for determining the chromogen content of cod-liver oils by the antimony trichloride method and other tests where rapid colour measurements have to be made. This colour test for vitamin A (Carr and Price), *Biochem. Jnl.*, XX, 497) requires a rapid determination of the colour produced when a solution of antimony trichloride in dry chloroform is added to the substance under test. This colour is fugitive, reaching a maximum about 15 seconds after mixing, so that it is necessary to make the observation quickly.

The use of a dipping pipette to measure the reagent in performing this test is open to several objections—it disturbs any sediment in the reagent, it is liable to drip, and it becomes coated with antimony oxychloride if not rinsed with chloroform immediately after use. A burette may be used, but is not ideal, as, at the moment when the reagent is added to the substance under test, the attention should be free to match the colour. A special apparatus for the storage of the reagent and delivery of the required quantity is therefore a great convenience. This is provided for by the B.D.H. automatic pipette, which offers the following advantages in use: (*a*) the reagent is protected from moisture; (*b*) it can be withdrawn without disturbing the sediment; (*c*) it can be added to the tube containing the substance under test when the latter is in position in the tintometer; and (*d*) there are no ground glass joints or taps, and no rubber, in contact with the reagent.

John C. Carlson

THE Seitz' Experimental Filters, supplied by John C. Carlson 149, Farringdon Road, London, E.C.1, are eminently suited for general laboratory work. The smallest filter of this type will handle up to six pints per hour, larger sizes are available with capacities up to nine gallons per hour. These quantities are, of course, dependent upon the nature of the liquid being filtered. Total outputs of up to 50 gallons can be obtained with the largest filter of this type, but this is controlled by the degree of turbidity and viscosity of the liquid. Their working is in every way similar to that of the commercial-size Seitz' filters, and is based on the principle of the well-known Gooch crucibles. A portion of the liquid to be filtered is mixed with the requisite amount of suitable filtering material, and this mixture is poured into the filter. The filtrate is then poured back into the filter, and when it runs bright, further supplies of the unfiltered liquid are added and the filtrate is allowed to collect in a suitable receiving vessel. The larger Seitz' experimental filters are provided with a pressure lid, so that the filter can be fed automatically from a small tank situated a few feet above the level of the filter itself.

The filtering material used with these filters is a finely divided mixture of asbestos and cellulose, and is supplied in a wide range of porosities. It is thus possible to find a filtering material which is suited to the viscosity and turbidity of almost any liquid under treatment. Such small amounts of this filtering material are used that the filters are cheaper than paper filters in respect of running costs. They are very suitable for the filtration of samples which are to be sent out to customers, test mixtures (as in varnish manufacture), for dealing with small bulks of expensive products, and in general laboratory work.

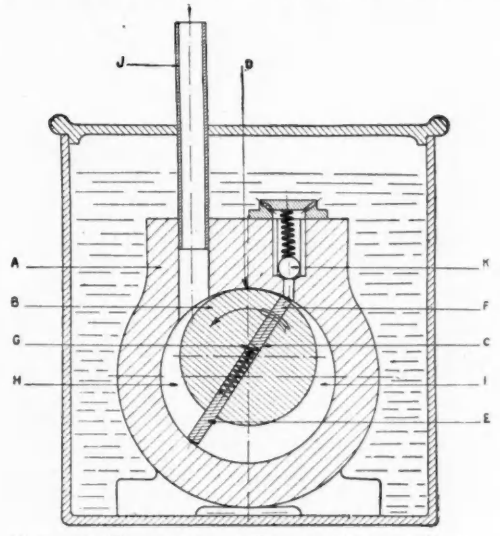
Chance Brothers and Co., Ltd.

FOR the diversity of its productions, probably no glass works in the world can equal that of the old established works of Chance Brothers and Co., Ltd., Smethwick, Birmingham, which was founded 107 years ago. Their productions range from various grades of ordinary window glass to scientific glasses, such as optical glass as used in the manufacture of telescopes, gun sights, binoculars and cameras. Glass for spectacle lenses is also produced here, including the well-known Chance's Crookes glass, which was evolved in their research laboratories in collaboration with the late Sir William Crookes.

Resistance laboratory glass is produced in a new and improved quality which is equal, if not superior, to that of German manufacture, which in pre-war days was so much in evidence in British laboratories. That this is appreciated by the British chemists is proved by the continually increasing demand which the wholesale laboratory furnishers are getting for this glass.

W. Edwards and Co.

STEADY reduction in production costs, together with improvement in quality of fine products, is causing interest in vacuum pumps which are capable of maintaining a high vacuum in stills, drying vessels, etc. Substances which are easily decomposed by heat on attempting distillation are frequently dealt with by decreasing the pressure in the still. For certain work this reduction in pressure is carried to very



WORKING PRINCIPLES OF ROTARY VACUUM PUMP.

low values, and as a result products are isolated by a simple distillation process where otherwise complicated, and possibly wasteful, extraction and crystallisation methods would be necessary. To attain these very low pressures and to efficiently handle the large volumes of attenuated vapour, it is, therefore, necessary to use special pumps and apparatus.

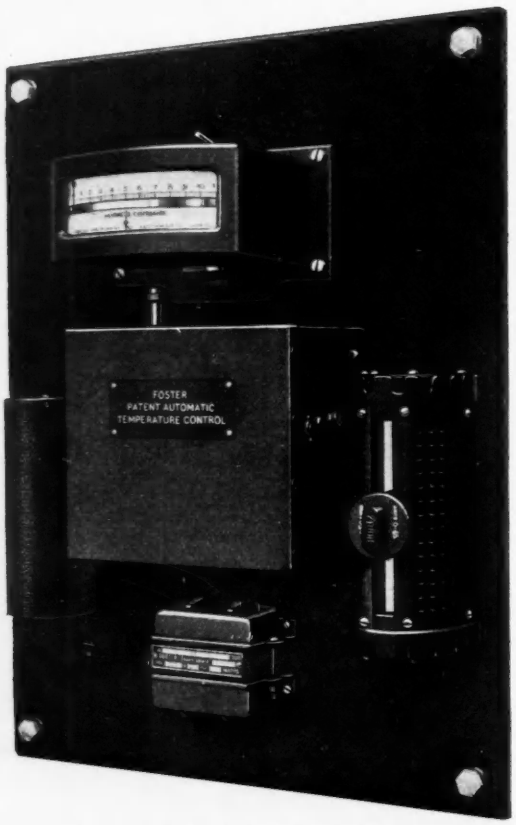
Many types of vacuum pumps are supplied by W. Edwards and Co., Allendale Road, London, S.E.5, each type being suitable for a particular class of work. The rotary pumps are generally preferred by users owing to their reliability, high efficiency, small power consumption, and the fact that they maintain their performance over many years of continuous service. As will be seen from the accompanying diagram the principle of operation for these pumps is very simple, as owing to the continuous rotary motion and absence of shock, there is practically no wear and skilled attention is, therefore, unnecessary.

Evans, Adlard and Co., Ltd.

PURE filter papers for laboratory work and in qualities to suit all industrial purposes is the speciality of Evans, Adlard and Co., Ltd., of Winchcombe, Cheltenham. They have now been making filter papers for upwards of 50 years, and their productions are stocked by all the leading wholesale laboratory furnishers.

Foster Instrument Co.

THE use of pyrometers is now generally accepted in chemical engineering, and experience proves that automatic control results in better regulation than the most careful hand control and leaves the skilled operator free for other superintendence duties. The Foster Instrument Co., of Letchworth, make a wide range of control systems and their apparatus is employed in a variety of industrial heating processes. The accompanying illustration shows a control panel operated by means of a thermo-electric pyrometer and controlling the temperature of a large electric furnace run on alternating current. The indicator is seen at the top of the panel with the black moving pointer at zero. Below the scale there is a red index which hows the position at which the control is to work; this is



CONTROL PANEL OF THERMO-ELECTRIC PYROMETER, AS SUPPLIED BY FOSTER INSTRUMENT CO.

adjustable at the will of the user. Inside the indicator case and over the black moving pointer is a presser bar which is periodically depressed on to the pointer. If the temperature is at the desired figure no change is made in the heating. If it is above the desired figure by even the smallest amount the depression of the pointer closes the primary of a small relay and actuates a switch resulting in cutting off the heating current. If the temperature is too low the converse action takes place.

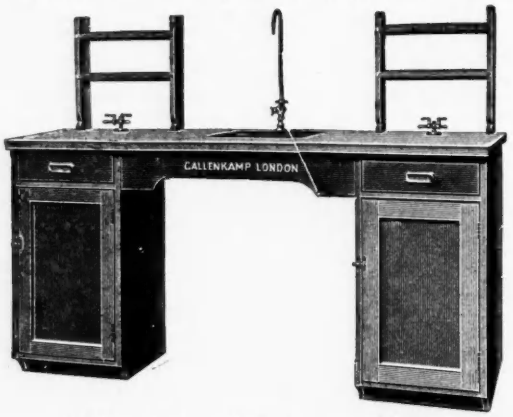
The depression mechanism is actuated by a pusher rod which is seen projecting above the central motor box. In this latter box is a small electric motor, with a reduction gear so arranged that there is a depression about once every five seconds, this giving a very close temperature control. Contained in the central motor box is also a relay with sealed mercury contacts in an inert gas, which closes or opens a circuit to the main contacter and puts on or cuts off the heating currents. The speed of the motor and, thereby, the frequency of the successive depressions, is regulated by the fixed and variable resistances seen on either side of the central motor box. The periodic depression of the pointer, by means of which the control is actuated, does not damage the delicate pivot points on which the pointer is carried because these are spring mounted by the well-known Foster " Resilia " system. When a record is taken from the temperature of the furnace walls, the chart shows a saw-tooth form of record with small rapid oscillations above and below the desired figure, but when the recorder is connected to a thermo-couple embeded in the material under treatment, these small oscillations practically disappear, so that the material experiences virtually a constant temperature.

A. Gallenkamp and Co., Ltd.

IMPROVEMENTS in modern laboratory furnishings and fitments are being continuously put forward by A. Gallenkamp and Co., Ltd., 17–29, Sun Street, London, E.C.2, who have also devoted considerable attention to the standardisation of such goods. Their " Technico " standard unit system, for instance, meets practically all the requirements of a modern chemical laboratory, and extra units can be installed as required. These units are made to the following specifications :—

Cupboard and two drawers, 3 ft. wide by 1 ft. 9 in. deep.
Cupboard and one drawer, 1 ft. 6 in. wide by 1 ft. 9 in. deep.
Tier of six drawers, 3 ft. wide by 1 ft. 9 in. deep.
Tier of five drawers, 1 ft. 6 in. wide by 1 ft. 9 in. deep.

The teak tops, 2 ft. 3 in. wide, are supplied to required lengths. The exterior woodwork of the units is of oak, and is sent out from stock ready for assembly; this can be done



A " GALLENKAMP " LABORATORY BENCH

quite easily by unskilled labour, the local plumber making the necessary connections to services. The units can be arranged in various combinations to pull out from under the bench tops, so that service pipes are easily accessible. In normal cases the bench tops project 5 in. from the backs of the cupboards in the wall benches and 10 in. in double benches. This arrangement can be varied to suit the position of doors, windows, gas and water services, flues, etc. The advantages of this system are that by making up in quantities, the best quality work is supplied at a low price, there is a saving of transport, the units are easily refixed in case of removal, and prompt delivery can be arranged. " Technolite," a pure white material, which acids and alkalis cannot stain, is now largely used for the tops of titration benches and especially in laboratories where clean, sterile conditions are demanded. " Asbestolite," 1 in. thick, is being used for combustion benches, fume cupboards, in preference to slate, as this material is not liable to crack.

J. W. Harris

HEADWAY is being made by J. W. Harris, 53, Deansfield Road, London, S.E.9, in producing fine British balances at a very moderate cost. Their standard analytical model, sensitivity 0·1 milligram, capacity 200 grams, has a 6 in. beam which ensures great speed in weighing combined with the utmost accuracy. These balances, whether new or reconditioned, are finished throughout with some twenty coats of hot lacquer, and with the usual amount of care they are claimed to withstand the action of acid fumes for a period of 30 years or more. In addition, every part is made and finished to attain the

greatest accuracy and duration of service. All agate knife edges are polished optically true, and whilst agate planes are optically flat and even wear throughout, the life of the balance is thus assured.

F. Jahn and Co.

THE new "Ultrameta" pressure filtering equipment, introduced by F. Jahn and Co., 15, Britannia Street, London, W.C.1, is especially suitable for the efficient clarification of cloudy liquids, such as wine, vinegar, beer, hot glue or galatine, oil, glycerine, petrol, fruit juices and sugar solutions. Filtration is effected by pressure forcing the cloudy liquor through compressed layers of cotton pulp, 2 in. thick, or some similar material, such as prepared asbestos. The filter press is composed of the usual horizontal frame with central screw. A number of deeply recessed aluminium alloy plates hold the corresponding number of 20¼ in. diam. by 2 in. thick compressed cotton pulp cakes between them; these plates are easily interchangeable. The recessed plates are very deeply grooved, making it unnecessary to use any sieves whatever, and both inlet and outlet from the plate surfaces are free from liquor flow impediment. The extra deep recessment provided in the plates also makes it possible to insert between each pair of plates two separate layers each an inch thick of cotton pulp and to place between those two layers a cloth coated with activated carbon. Thereby a most efficient filtering effect, combined with decolourising, can be obtained in one operation.

In a gelatine factory where this filtering equipment is working, filtrate of the highest transparency is obtained at the rate of 500 gallons per hour. The equipment consists of: (1) a horizontal type filter press with alternatively arranged deeply recessed plates, in sufficient number to suit the desired output; (2) a "washer" for cleansing the cotton pulp after use in the filter press; (3) a hand-operated cotton pulp "cake compressing press" for "remaking" the cotton pulp; (4) a steam-driven slow pressure "Duplex" pump, fitted with monel metal fittings and relief valves.

A. R. Jahn's recent inventions relating to pressure filter constructions are described in British patent specifications Nos. 318,687, 334,663, 339,669.

Johnson Matthey and Co., Ltd.

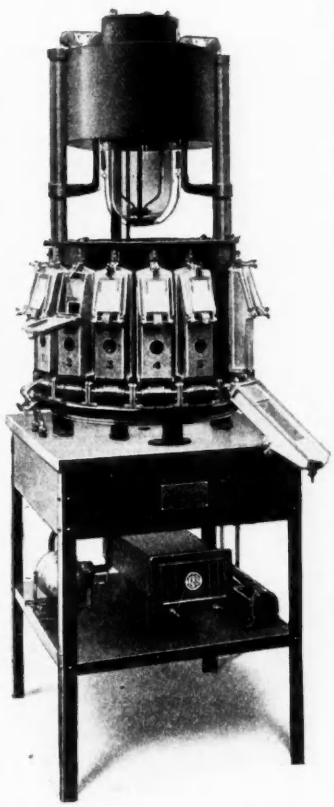
THE main factors inducing the use of platinum in laboratory equipment are its ability to withstand high temperature and the resistance of the metal to attack by chemicals. Scarcely less important, however, is the thermal conductivity of the metal which saves many hours of laboratory work and reduces the costs of investigations and analytical work accordingly. It has also been definitely established that over a period of time the use of platinum is far more economical than the use of substitutes, which do not equal this metal where accuracy and high temperature resistance are required. Its stability is also far greater, and incorrect determinations due to loss of weight, or to the introduction of impurities, are, therefore, less likely to occur.

As the extent to which platinum is employed is very largely determined by price, it may not be out of place to mention that a close study of the platinum market reveals that ample supplies are available from sources within the Empire, and conditions are such as to make the maintenance of high prices impossible. The use of platinum for all purposes except those of extreme national importance, was precluded by Government edict during the War when the need for platinum was very accurately felt, but after the War this ban was lifted and the stocks in the hands of the British Government were then entrusted to Johnson Matthey and Co., Ltd., for ultimate disposal. Immediately after the War, America demanded large quantities of the metal for ornamental purposes which, coupled with the holding up of supplies by Russia, led to a shortage, and to check consumption and increase production prices were raised. As previously mentioned, however, users of platinum ware are now able to view the future with a degree of confidence both as regards supplies and price.

The large experience held by Johnson Matthey and Co., Ltd., in the refining of platinum and its preparation for laboratory and industrial purposes is widely recognised throughout the world. Only the purest platinum and platinum metals are used in the laboratory ware which is manufactured by them, all platinum being specially refined for this purpose. The successive steps of manufacture are also carefully supervised, and the finished product is subjected to rigid tests to fully guarantee it against chemical and physical defects. The extreme precautions taken during refining, as well as in the mechanical treatment of their platinum ware, follow methods which have developed over a period of one hundred years, and such products should, therefore, possess the highest durability that can be obtained in platinum designed for use in the laboratory and in manufacturing processes.

Kelvin Bottomley and Baird, Ltd.

THE K.B.B. fugitometer outfit which we illustrate has been designed in collaboration with the British Research Association for the Woollen and Worsted Industries to enable the testing of dyed materials in respect of permanence, or conversely, fading characteristics, to be rapidly carried out. This apparatus incorporates the findings of a long series of researches on the fading of coloured materials when subjected to the combined effects of light and humidity. Here it has been found that humidity is a factor of the very greatest importance, and that a test under a source of light alone is useless for comparative purposes. In order that really useful information may be obtained, samples undergoing test must, therefore, be surrounded by an atmosphere of known and constant humidity while they are subjected to the radiation of a standard light source comprising all the constituents of sunlight.



THE "K.B.B." FUGITOMETER

In the fugitometer, which is made by Kelvin Bottomley and Baird, Ltd., of 18, Cambridge Street, Glasgow, each sample under test is housed in an air-tight swatch box, in one wall of which a Vita glass window is mounted so that the sample may be irradiated by a special form of electric lamp having a long-flame actinic arc, under controlled humidity conditions. The air which slowly circulates through the swatch-holders is conditioned in a separate humidifying compartment through which the air is drawn by a small electrically-driven circulator. The air circulates through a closed system comprising the swatch-boxes and humidifier. The degree of humidity can be changed at will by manipulating the solution in the humidifier, but when set for a given humidity, the conditions will remain unchanged as long as may be desired. The swatch-boxes can be swung outward to permit of the inspection of the sample through the Vita glass window without opening the circuit to the external air. The outfit is supplied adjusted for the declared voltage, and only needs to be connected to the electrical circuit through the switches and fuses mounted upon it.

The K.B.B. fluorescence cabinet, another production of Kelvin Bottomley and Baird, Ltd., permits the examination of substances under ultra-violet radiation, which is now assuming great importance in the examination of foodstuffs, paper, rubber, paint, textiles and other manufactures. Bacterial damage in wool and cotton which is ordinarily invisible shows up strongly by the fluorescences exhibited under ultra-

violet radiation when examined in the K.B.B. cabinet. Qualitative analysis by examination under ultra-violet radiation in a large number of cases is also very readily and rapidly carried out.

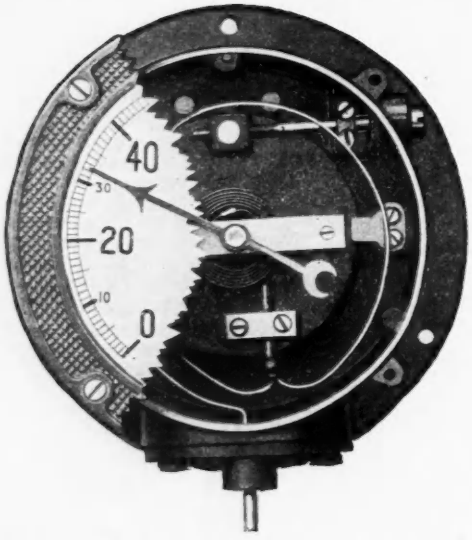
This cabinet should also be of special interest to analytical chemists in the titration of muddy liquors, for if a drop of

THE " K.B.B." FUGITOMETER

saturated solution of quinine sulphate is added to an ordinary neutral solution as an indicator, fluorescence under ultra-violet radiation will be very small whilst the solution is alkaline, but on approaching acidity an intense blue fluorescence becomes evident, due to the formation of the acid sulphate of quinine.

Negretti and Zambra

THE Negretti and Zambra mercury-in-steel thermometer appeals especially to the chemical plant engineer because it is robust, and when once installed, requires no attention.



MOVEMENT OF NEGRETTI AND ZAMBRA MERCURY-IN-STEEL THERMOMETER

A special feature of this instrument is the direct action movement; as the mercury is forced from the bulb, it actuates a Bourdon tube which in turn moves a pointer over the dial. As will be seen from the illustration, there are no gears, levers or hairsprings to get out of order or to create backlash or friction. The instrument is designed with as few moving parts as possible in order to give maximum efficiency with minimum attention.

For oil refining plant, Negretti and Zambra have supplied a large number of distance recording mercury-in-steel thermometers; in that case the bulb is connected to the recording mechanism by means of a patented mercury-in-steel compensated capillary tubing, which is capable of giving readings to a very high degree of accuracy, irrespective of the temperature in the air through which the tubing passes. Where it is desired to read a number of temperature points on one indicator, the electrical instrument is supplied; here the parts are as solid as possible to give long service, but at the same time all connections, adjustments, etc., are easily accessible.

Negretti and Zambra are also well known for their extremely accurate chemical thermometers, which are made to the specification of the I.P.T. and the A.S.T.M., and, if desired, can be supplied with National Physical Laboratory Certificates.

Newton and Co.

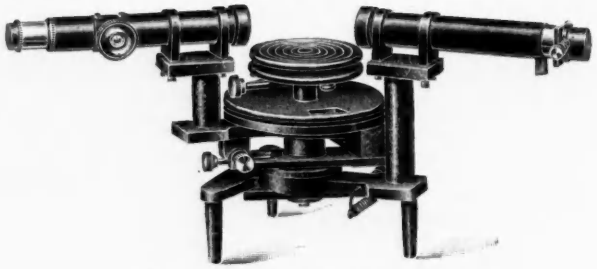
IT is now a recognised fact that British made optical instruments can be compared for quality and efficiency with the productions of any other country in the world. This applies particularly to optical projection apparatus, which are so much used for the purpose of illustrating lectures where it is desired to show actual experiments projected upon the screen. Instruments such as the popular epidiascopes, however, lend themselves to cheap and flimsy construction, and it is quite easy to obtain good-looking apparatus which in practical use is found to be very unsatisfactory, and in a very short time may even have to be replaced with something of sounder construction.

As manufacturers of optical projection apparatus, Newton and Co., 72, Wigmore Street, London, W.1, consider that rigidity and durability are of primary importance and their instruments are constructed in such a way that they may be relied upon to stand continuous and heavy wear in the lecture theatre or laboratory. Cast aluminium is very largely used for the construction of the bodies and other parts of the instruments, replacing sheet metal work with its attendant disadvantage.

During the past few years very great advances have been made in the construction of suitable objectives both for opaque and transparent projection, and the " Wigmore " series of lantern and epidiascope lenses, also supplied by Newton and Co., may be compared with the productions of any other country.

Precision Tool and Instrument Co.

AMONGST the many productions of the Precision Tool and Instrument Co., 72, Newington Butts, London, S.E.11, are optical benches, vernier microscopes, cathetometers and other experimental apparatus. We illustrate one of their spectrometers, which is provided with a 5 in. protected circle



AN IMPROVED FORM OF SPECTROMETER

with vernier reading to one minute. The circle and telescope are attached to the outer centre and move together. The telescope is counterpoised and provided with web cross lines, rack-motion focusing arrangement, clamp, and fine adjustment. The collimator has a protected adjustable slit and clamping ring, so that it can be set for verticality and focal distance once for all. The prism table is adjustable by means of three

levelling screws, and can be raised or lowered to any convenient height. The object glasses of both telescope and collimator are about 7 in. in focal length, and have a clear aperture of $\frac{7}{8}$ in. Adjustments are provided for setting the optical axis of telescope and collimator at right angles to the vertical axis of the instrument.

J. Preston, Ltd.

In Sheffield J. Preston, Ltd., have recently completed the hundredth year of their existence as laboratory furnishers. They report that apparatus to standard specifications, such as those issued by B.E.S.A., I.P.T. or S.T.P.T.C. are becoming more generally used, and they are therefore specialising in such apparatus, as well as in chemicals which conform to the analytical reagent standards.

Premier Filterpress Co., Ltd.

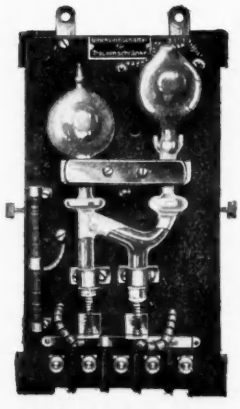
The Premier Filterpress Co., Ltd., of Finsbury Pavement House, London, E.C.2, are sole selling agents in the United Kingdom for the filter presses made by A. L. G. Dehne, Halle o. Saale, Germany. These presses are supplied in sizes suitable for use in laboratories and as plant units operating on a semi-manufacturing scale. For instance, they are made in sizes where the total filtering surface varies from $\frac{3}{5}$ to $6\frac{3}{4}$ square feet. Alternative patterns are available according to whether the washing of the press cake is to be carried out or not; heating and cooling arrangements are provided for in other patterns.

Reynolds and Bransom, Ltd.

This firm, whose address is 14 Commercial Street, Leeds, are complete laboratory furnishers. They supply balances and weights, laboratory apparatus, electrical and optical apparatus, and first-aid appliances agreeing with the Home Office requirements. They also have a glass blowing department and workshops in which special apparatus can be made in wood, metal or glass. Repairs to scientific apparatus and the manufacture of instruments to customer's own designs are also undertaken.

Scientific Glass Blowing Co.

Being in close proximity to a university which is an active centre for research, as well as a training ground for those who intend entering the chemical and allied industries, it is not surprising that The Scientific Glass Blowing Co., 12–14, Wright Street, Oxford Road, Manchester, have received a full share of enquiries for apparatus which is to meet special requirements. The accompanying illustration shows an automatic temperature regulating device which has been introduced for use with electrically-heated ovens. This device is operated by means of a metal contact thermometer which in turn actuates a mercury relay, and is applicable for use in ovens working at any temperature up to 1000° C. The sensitive part of the contact thermometer is a metal tube at least 12 in. long with a high coefficient of expansion, in which is located a rod possessing a very low coefficient of expansion so as to ensure the highest possible difference in the alteration of length. By means of suitable mechanism this difference in expansion is increased in such a way that any desired temperature up to the maximum heat capacity of the oven or bath can easily be adjusted by simply turning an adjusting screw and is maintained most accurately for an indefinite length of time. The circuit is broken by platinum contacts which permit of connecting the thermometer to 110 volts. By the use of a suitable strength of current the contacts can be guaranteed to attain an almost unlimited life. The action of the relay depends on the movement of a column of mercury by the heating and cooling of gas. The heating of this gas is effected by means of the incandescent lamp which is switched on and out by the thermometer.



Automatic Temperature Regulating Device for Electrically-heated Ovens

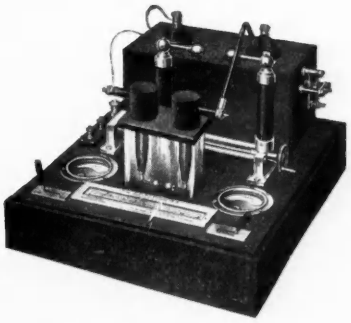
Sigma Instrument Co.

Sigma instruments and apparatus, as supplied by the Sigma Instrument Co., Letchworth, Herts, are extensively used in the manufacture of producer gas, water gas or town gas. One of the Sigma recording calorimeters has been approved by the Gas Referees for use as a statutory instrument to satisfy the requirements of the Gas Regulation Act. These recording calorimeters are used extensively abroad, particularly in Japan, and thay have also been approved by the New Zealand Gas Referees for statutory use. On producer gas plants a recording calorimeter increases the efficiency of the plant, in that its absence could easily lead to carelessness in control, with the consequent production of holes through the fuel bed.

In addition to gas calorimeters the Sigma Instrument Co. manufacture pressure recorders, and specific gravity recorders for gases. They also make pressure governors of high accuracy, and apparatus for the automatic control of calorific value.

Walker, Crosweller and Co., Ltd.

To those concerned with the generation and distribution of electrical energy on a large scale, the maintenance of transformers and high-tension switchgear in an efficient condition is an important problem. Formerly, when only small quantities of insulating oil were used, it was comparatively inexpensive to ensure safety by complete replacement at regular intervals, but now that large quantities of oil are being employed, it is essential to test the oil for dielectric strength at frequent intervals, and especially after it has been put through any filtering or other purifying process. It is only occasionally that a testing transformer is available for this purpose, and when samples are sent away for the test it is often impossible to prevent contamination by microscopic quantities of fibre, dirt or moisture which are sufficient to render the sample completely unrepresentative of the bulk from which it was taken.



Dielectrimeter for Testing Transformer Oils

There are, therefore, several advantages in testing samples at the place where the oil is actually in use. The dielectrimeter, illustrated above, was designed for this purpose and is supplied by Walker, Crosweller and Co., Ltd., 20, Queen Elizabeth Street, London, S.E.1. This instrument is easily carried by one man, and a series of breakdown tests on an oil sample can be made in a few minutes with readings up to 62,000 volts.

Alexander Wright and Co., Ltd.

The accurate measurement of gas volumes has for long been one of the chief activities of Alexander Wright and Co., Ltd., 1, Westminster Palace Gardens, Westminster, S.W.1. In consequence they have designed a considerable number of specially-made meters for various purposes. Although meters of any size have a large range of adaptability, if accuracy is desired, the size of the revolving drum and its speed must have a definite relation to the required minimum or maximum flow, and to this point special attention is given. Any undue

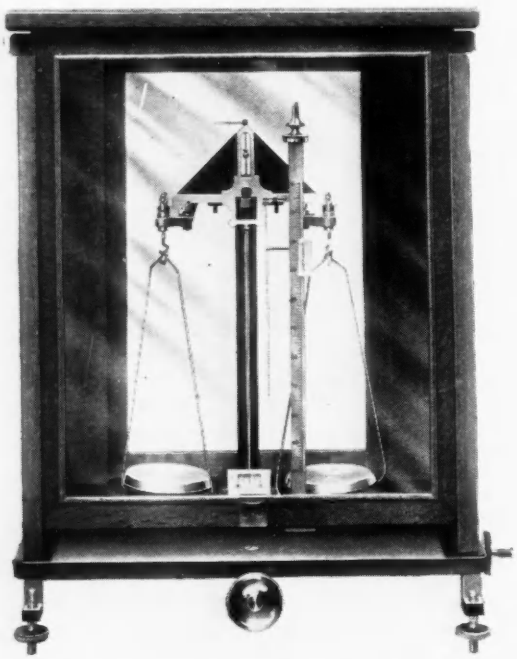
disturbance of the water level affects the capacity, and the gas should always pass at a speed which leaves the water inside the drum and in the outside casing at the same level,

STANDARD TEST METER AS MADE BY ALEXANDER WRIGHT AND CO., LTD.

allowing for the slight difference which is necessary in rotating the drum.

W. A. Webb, Ltd.

AN item of interest to those engaged on analytical work is the new chainomatic balance introduced by W. A. Webb, Ltd., 4/5, Skinner Street, London. Built on the lines of well-known Continental makes, but with the precision and



THE NEW CHAINOMATIC BALANCE (W. A. WEBB, LTD.).

accuracy on which this firm is so rapidly building a reputation, it is a remarkably good proposition so far as quality and price are concerned. The chainomatic attachment, of which they are the patentees, is operated by direct action controlled from outside the case, and therefore eliminates the possibility of slip in the raising gear, or of the Vernier, movement being instant and precise.

Current Technical Publications

IN CONNECTION with the recent exhibition held at the Imperial Institute to draw attention to the mineral resources of the Empire, a handbook entitled *A Survey of the Mineral Position of the British Empire* was published by H.M. Stationery Office (price 2s. net). This handbook should be useful to all who are directly or indirectly interested in the mineral industries of each of the Empire countries. It discusses the mineral resources of the Empire as a whole in comparison with those of the world, and, by means of statistical tables, shows the present extent of Empire world trade in mineral products.

THE NATURE OF VARIATIONS in the vitamin content of cod liver oils from fish from various sources, and the refinement of medicinal cod liver oil with a view to retaining the full vitamin properties of Empire oils, were researches recommended by the Imperial Economic Committee on the occasion of their Report on Fish and Fish Products. Conclusions drawn from research carried out along these lines have recently been published by the Empire Marketing Board (*The Relative Values of Cod Liver Oils from Various Sources*. By Professors J. C. Drummond and T. P. Hilditch. H.M. Stationery Office, Publication E.M.B. 35. Price 1s. net).

THE British National Committee of the World Power Conference, whose offices are at 63, Lincoln's Inn Fields, London, W.C.2, has issued the first monthly number of its *Power and Fuel Bulletin*. This bulletin originated from a suggestion of the American National Committee at the meeting of the International Executive Council of the World Power Conference in 1929, and the suggestion was then considered by the British National Committee. It is intended to supply a comprehensive and authoritative bibliography of current information on power, fuel and related subjects, and is printed on one side of the paper only to facilitate mounting on index cards. The following organisations are co-operating in the compilation of this bibliography: Fuel Research Division, Department of Scientific and Industrial Research; British Chemical Plant Manufacturers' Association; British Electrical and Allied Manufacturers' Association; Institution of Petroleum Technologists; National Federation of Iron and Steel Manufacturers; National Gas Council of Great Britain and Ireland. Germany, Japan, Czechoslovakia, and the United States are preparing similar bulleting, and it is expected that other member-countries will ultimately do so.

Progress of the Rio Tinto Co.

THE fifty-eighth ordinary general meeting of the Rio Tinto Co., Ltd., was held at Cannon Street Hotel, London, on Thursday, April 16. The chairman, the Rt. Hon. Sir Auckland Geddes, said that the company is producing their full quota of copper. The new concentrator and sintering plant is in operation, but is limited, of course, by the quota restrictions. In Spain, the company is equipped and ready to live through any period of depression in copper prices that any producer can face so far as costs of production are concerned. Through their interests in the Pyrites Co., the Davison Chemical Co., and Silica Gel Corporation, in the United States, as well as their interests in Europe, they should benefit in no small way. Mineral Separation, Ltd., in which they are very large shareholders, is also doing well. Technically the progress during the year under review had been satisfactory, but in view of the state of the markets they had not thought it wise to push forward too rapidly with some of the new processes.

The Rio Tinto Co. produces and sells sulphur, in the form of pyrites; iron, in ore and sinter; and copper, for electrolytic refining and as refined copper. The sulphur goes principally into acid for agricultural fertiliser.

Boiled Linseed Oil for Roumania

THE Commercial Secretary to H.M. Legation at Bucharest reports that the Roumanian State Railways' administration is calling for tenders to be presented in Bucharest by April 29 for the supply of 200,000 kilograms of boiled linseed oil. Firms desirous of offering oil of British manufacture can obtain further particulars upon application to the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1. Reference No. B.X. 7,054 should be quoted.

The Manufacture of Carba Dry Ice

By G. H. Grimwade

Mr. Grimwade, the writer of the following article on the manufacture and applications of solidified carbon dioxide, is the Managing Director of Carba Dry Ice (Australia), Ltd. The article is reprinted from the Australian "Chemical Engineering and Mining Review."

DRY ice, the new refrigerant, is simply solidified carbon dioxide. This gas, which has long been a commercial product, occurs naturally to the extent of 0·03 per cent. in the atmosphere, and is probably met with more frequently than any other gas save the two main components of the atmosphere.

Commercial carbon dioxide is produced mainly by the combustion of a fuel or the collection of by-product gas from some process involving organic oxidation—for example, sugar refineries and distilleries. The most common processes use coke as fuel. Charcoal is also suitable, but a new process uses crude oil. Coal is unsuitable owing to its comparatively high sulphur content, as the sulphur dioxide formed in the combustion poisons the absorbent. From a good boiler the carbon dioxide content in the flue gas may average as high as 18 per cent. Of this 18 per cent. only a little over half may be economically absorbed, thus representing a serious inefficiency in the process.

Extraction from Flue Gases

For example, the use of an organic absorbent which would readily extract the whole of the carbon dioxide from the flue gas would yield the gas at a price which is not obtainable at present and lead to its use for a variety of purposes in very greatly increased quantities. The function of the boiler must be to produce the maximum amount of carbon dioxide in the flue gas consistent with the raising of sufficient power to drive the compressors, and pumps for circulating the absorbent and cooling and condensing water. The boiler at the works of Carba Dry Ice (Australia), Ltd., at Richmond, Vic., is 17 ft. 7 in. long by 8 ft. 6 in. diameter, and has a total grate area of 46 sq. ft.

The flue gases, from which as much heat as possible should be extracted by the boiler, are drawn by a fan through a settling pit and then passed upwards through one or two scrubbing towers, 30 ft. 3 in. high and 7 ft. 6 in. inside diameter. This tower is filled with pieces of magnesite or limestone and a steady stream of water flows through this packing. By these means the gases are cooled and entirely freed from dust, sulphur dioxide and ammonia. The gases then pass through the fan, and in turn through two or three absorbing towers, 70 ft. 6 in. high and 6 ft. inside diameter. These towers are packed with carefully graded foundry coke, the smaller pieces at the top ranging from, roughly, ½ in. to 4 in. diameters. In these vessels the gases meet the absorbent lye which is about a 10 per cent. solution of potassium carbonate. This lye enters the system at the opposite end to the gas and traverses each absorber in turn. Consequently, the gas, rich in carbon dioxide, meets lye in which the change to bicarbonate is almost complete, and gas weak in carbon dioxide meets the highly absorbent lye.

As is well known, this reaction is reversible, and now by heating the bicarbonate solution the carbon dioxide gas may be obtained in a chemically pure state. To effect this the lye with the carbon dioxide in combination passes to a heat interchanger and thence to a two-compartment vessel misnamed an evaporator. Here it is first heated by the hot gas being boiled from preceding lye to about 98 deg. C. and then finally by exhaust steam from the engines driving compressor and pumps to about 101·5 deg. C. At this temperature gas is freely evolved, and the resulting carbonate solution returns *via* the heat exchanger, where it gives the incoming lye a preliminary warming, to a storage tank for a further circuit of the system.

Periodic additions of potassium carbonate are made to the lye tank to bring the liquor to the desired concentration which is found to be of specific gravity 1·12. With careful washing of the flue gas the life of this absorbent is almost indefinite.

The gas from the evaporator is cooled by water in a large tubular vessel and compressed usually in a three-stage compressor to the neighbourhood of 1,000 lb. to the sq. in., and cooled again when it liquefies, provided the condenser temperature is sufficiently below the critical value of 31·8° C. The commercial liquid is stored in the familiar steel cylinders, but in the Carba process, in order to have a sufficient reservoir of liquid always at hand, four to six steel bottles about 18 ft. high and 2 ft. diameter are used.

Coke for the process should have calorific value of 11,000 to 12,000 B.Th.U. per lb. and as low ash and water content as possible. Sulphur and nitrogen should not exceed 0·05 per cent. From such coke a yield of 2 lb. of carbon dioxide from 1 lb. of coke is obtainable against a theoretical yield of 3½ : 1, but even as little as 1 : 1 is considered fair practice.

The only other requirement of the process is a plentiful supply of cool water, and for a plant of capacity 400 lb. of liquid carbon dioxide per hour as much as 12,000 gal. of water per hour may be used to advantage.

Rapid Expansion of Liquid

We now have a supply of liquid carbon dioxide under its own vapour pressure of 700 lb. to 1,100 lb. to the sq. in. according to the temperature. It is by the rapid expansion of this liquid that the dry ice is produced, not by the utilisation of the Joule-Thomson effect as was formerly considered. When by expansion pressure has fallen below the triple point, the temperature falls below the freezing point of carbon dioxide and drops of liquid are converted into snow. From 100 parts of liquid, by rapid expansion, 15 parts of solid and 85 parts of vapour are formed. Careful pre-cooling raises the amount of solid to about 33 parts. The gas resulting from the expansion is, of course, reliquefied and returned to the storage bottles.

In order to understand the Carba process of solidification a clear conception must be obtained of the conditions prevailing at the triple point of carbon dioxide. The basic difference between the Carba and older processes is that in the former by expansion to at or near the triple point a wet snow or sludge is formed. By subsequent expansion to atmospheric pressure this wet snow is frozen to a solid block. In the older processes expansion was carried right through to atmospheric pressure, the resultant snow being quite dry. This was removed from the generator and compressed hydraulically. The loss by this method as against the Carba closed circuit process by contact of the finally divided snow with the air and by generation of heat during compression is quite obvious. Moreover, a block of greater specific gravity can be produced by the new method. A further saving arises from the need to recompress the expansion gas only from 5·2 atmospheres instead of from atmospheric pressure.

In a little over two years in which the Carba process has been known, about 45 plants of a total capacity of 250 tons per day have been erected in 27 different countries, and many more are on order or under construction. Nearly £3,000,000 has been invested in the process in countries other than America, where at least £5,000,000 is invested in the old process. The Carba rights for America have recently changed hands, and 10 plants, each of capacity of one ton per hour, are on order.

Advantages of Dry Ice

The actual cold content in B.Th.U. to be extracted compared with water ice is 2 : 1 by weight, or 3½ : 1 by volume. Where temperatures lower than freezing point are required this advantage becomes more apparent. It can be seen that this advantage alone cannot justify the price of commercial solid carbon dioxide. In America this commodity sells from 5 to 10 cents per lb., as against water ice at four dollars per ton, yet sales have increased to over 27,000,000 lb. in 1929, as against 9,000,000 lb. in 1928.

The other features which make this refrigerant economical in use compared with the far cheaper water ice are:—

Insulating property of carbon dioxide vapour. Absence of corrosion to equipment and contamination of perishable goods. Less weight of refrigerant, giving saving in freight and the possibility of using light vehicles. Dryness. Light, cheap, non-returnable containers. Ease of handling. Use of the total cold content as against drip waste from water ice, which leaves the system at almost the temperature of the ice

itself. Ventilation not required, refrigerant being self-ventilating. Bactericidal properties of the gas. Growing demand for lower temperatures. Use in applications where water ice is unsuitable—for example, carrying home, postal, express and air delivery of frosted goods. As an instance, large quantities of flowers are now transported from Holland to England by air with the use of dry ice.

In our own experience shipments of perishables have been sent up to 200 miles with 400 lb. of dry ice, and the consigners advised that five tons of crushed ice and five cwt. of salt, on which freight had to be paid, were used formerly. The time of packing the shipment was reduced from three hours to half an hour, and labour and equipment requirements were cut down considerably.

Mineral Development in Ireland

Free State Parliament's Scheme

DURING the present session the Irish Free State Parliament will consider the Mines and Minerals Bill prepared by the Minister for Industry and Commerce. This Bill will give the Government power to lease certain of its lands to public and private companies for the exploitation of the mineral rights. There is in Ireland a wealth of undeveloped minerals, and it is only lack of efficient organisation in the past that has withheld them from the market. Copper ore is to be found in the south and west, sulphur in some of the counties on the eastern seaboard, ochre in County Wicklow, coal in the lower midlands, and soapstone in the north-west. Lead deposits have been worked, but not with any great degree of success. The Shannon hydro-electric scheme will also play its part in the provision of cheap power for operation of the necessary machinery.

British Workers' Tour

THE tour abroad for British workers awarded as a prize in an essay competition promoted by the Economic League in association with several prominent business houses began on Monday. The subject of the essay was "How to Restore Britain's Industrial Prosperity." The twenty prize-winners have made visits in this country to the works of the Auto-Strop Safety Razor Co., the offices at Bouverie House of Benn Brothers, Ltd. (publishers of THE CHEMICAL AGE), Hovis, Ltd., Crosse and Blackwell, Ltd., and the Gas Light and Coke Co.—the firms acting jointly with the Economic League in promoting the competition. France, Belgium and Germany will be visited in the course of the tour, among the great industrial centres that the workers are to see being Liége, Essen, and Lille.

Sir Ernest Benn wished the travellers *bon voyage* at Bouverie House on Monday, and expressed his pleasure at the success of the competition. He uttered one note of warning—that, because what they saw was new to some of them, they must not infer that therefore it was better than its equivalent at home.

British Trade in Siam and Honduras

A MEMORANDUM regarding the appointment of agents, terms and methods of payment prevailing in relation to business with Siam, has been prepared by His Majesty's Consul-General at Bangkok.

A similar memorandum on methods of trading and the appointment of agents in Honduras has been prepared by His Majesty's Consul at Tegucigalpa.

British firms who desire to obtain copies of these memorandums, together with particulars of the Special Register Service of information, should apply to the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1. For Siam quote Reference No. C.X. 3,504; for Honduras, Reference No. C.X. 3,506.

Society of Chemical Industry

AT the annual meeting of the Newcastle Section of the Society of Chemical Industry, held at Armstrong College, Newcastle, on Friday, April 17, Dr. J. T. Dunne was re-elected chairman, Professor C. V. A. Briscoe was elected vice-chairman, Mr. M. Dawson, treasurer, and Mr. J. W. Craggs, hon. secretary.

Defects in Patent Law

Efficiency of the British Patent Office

A MEETING of the Manchester Section of the Society of Dyers and Colourists was held on Friday, April 17, Mr. W. F. Ermen presiding. An address on "What is Wrong with the Patent Law?" was given by Mr. H. E. Potts, the Honorary Patent Agent to the Society.

Mr. Potts stated that although the structure of British Patent Law was sound, its administration was unsound. The kernel of the problem lay in the ruinous cost of patent litigation. It was true, as a learned judge had said, that justice was free to all—but so was the Ritz Hotel. When any attempt was made to improve the procedure in the Patent Office, which at present was relatively expensive, the cry was always raised by the legal trade union that any such improvement would necessarily introduce into that tribunal the ruinously expensive methods which prevailed in the High Court.

Comparisons with France and Germany

We had nothing, Mr. Potts said, to learn in this country from the procedure of granting patents in France, which merely involved registration. There was no official examination at all, and the theory was that everything was left to the courts. The procedure in the German Patent Office was admirable, though in other respects that country suffered from the defects to which we ourselves were liable. The German Patent Office was invested with very wide powers, including the right to make an exhaustive search for novelty in regard not only to German, but to French and American patents. When they made such a search they were not bound to issue a patent merely because the patent disclosed something different, as they were entitled to go into the question whether an invention was involved. The decisions were given by a body which consisted of one lawyer, as chairman, and two technical men as referees.

Both in England and in Germany examiners of patents were scientifically trained, and if a claim was properly argued there were practically very few cases in which protection was wrongfully denied. The standard of American Patent Office examiners was not nearly so high, and, owing to constant changes in personnel, work was always in arrear. It could be stated without any fear of contradiction that the efficiency of the British Patent Office was extraordinarily high.

Irreconcilable Aims

People who criticised the British system of granting patents were usually guided by two irreconcilable considerations. On the one hand, they naturally desired to obtain patents as cheaply as possible; on the other, they wanted patents which, when obtained, would resist any attack in the courts. If it was possible to obtain a patent easily, it would naturally be easy to upset it. On the other hand, if an exhaustive examination for novelty was made, and if the inventive merits of the application were carefully considered in view of a possible attack of the patent in court, obviously the necessary procedure must be more expensive than that of a mere system of registration. When a patent was granted in Germany, as the result of the considered opinion of experts, although it was not really unchallengeable, it represented, *prima facie*, a forecast of what the courts were likely to uphold in case of an attack.

The British system was really a compromise between French and German practice. Although the statement was made that patents would not be granted to anyone who chose to apply in respect of any sort of nonsense written on a document, and although it was stated that a search would be made, that search, for some inscrutable reason, was confined to prior British patents of the previous 50 years. The examiner might know of a German specification, for instance, which was word for word identical, but he was not permitted to base any decision upon that knowledge. Among those who believed that the British Patent Office procedure should be reformed, the view was taken that the German system was the one to be followed in essentials.

British Association Centenary

THE centenary meeting of the British Association will be held in London, September 23–30. This will be the first meeting to be held in London in the history of the association, since it is a specific article of the statutes not to invade the ground covered by other institutions.

Chemical Industry Lawn Tennis Tournament

Entry Lists Still Open

WE have received a number of applications for THE CHEMICAL AGE Lawn Tennis Tournament, announced in our issue of April 4. The date provisionally fixed for the closing of the list of entries is May 4, and it is therefore essential that those who contemplate taking part in this interesting competition should send in their names at once. For this purpose we publish below the entry form which should be filled in by intending competitors and addressed: "Lawn Tennis Competition," THE CHEMICAL AGE, Bouverie House, Fleet Street, London, E.C.4.

[The Latest Date for Receiving Entries is May 4, 1931].

.....*Cut along this line and post coupon as directed*.....

Entry Form.

We have read the Rules of THE CHEMICAL AGE Lawn Tennis Tournament, and agree to abide by them.

Name of Competitor..... *Name of Competitor*.....

Name of Firm..... *Name of Firm*.....

Firm's Address..... *Firm's Address*.....

....

Telephone No..... *Telephone No*.....

Indian Chemical Notes

(BY OUR INDIAN CORRESPONDENT.)

Chir Tar Pitch

Experimental work undertaken at the Dehra Dun Forest Research Institute has resulted in the preparation of a satisfactory product from *chir* tar pitch by softening back with the lighter oils and by vulcanisation with sulphur, for use as a road painting material. Samples of the composition so prepared were sent to the Government Test House, Alipore, and as the result of the report received this composition was given a test on a portion of a road in Almora district. The results were not entirely unsatisfactory, but further improvements have been carried out which are bound to render the composition quite suitable for road painting purposes. With the success of this research the Forest Department will derive a profit from a product for which there has been up till now no sale.

Imports of Cement

It appears that though India's consumption of cement will rise, India will try to manufacture it more and more, and supply her increasing demand. This is indicated by the fact that in recent years the imports are growing less and less. In 1929–30, the imports amounted to 121,000 tons, valued at Rs. 64 lakhs, as compared with 127,000 tons, valued at Rs. 68 lakhs. Of the three chief importing provinces, Burma and Madras considerably reduced their requirements, while Bengal showed no appreciable change. The United Kingdom was the largest supplier, sending 81,000 tons as against 91,000 tons in the previous year. Japan's contribution rose from 14,000 tons to 18,000 tons, and this progress of Japan in the Indian market has been steady. Receipts from other countries except Italy and Austria also showed increases.

High Grade Tobacco in Bengal

In the Chemical Section of the Agricultural Department in Bengal, an investigation into the nicotine content of tobacco at different stages up to the cured leaf is in progress. Nine acres of wrapper leaf of good quality were grown on the Burirhat farm, and about 65 acres of exotic tobaccos, chiefly Sumatra, were grown on contract by local cultivators in different parts of the province. The results so far have held out promise that the production in Bengal of high-grade tobacco leaf, capable of taking a good place in the world's market is a reasonable probability.

Salt Import Duty

The Tariff Board's report on the salt industry had been submitted to Government about a year ago. When the question came before the Assembly in the present session, the matter was referred to a Select Committee of the House for report, and this Committee proposes an import duty of 4½ ans. per maund of imported salt so as to raise the wholesale price at Calcutta by Rs. 28-2 per 100 maunds. This, it is calculated, would give Indian salt an opportunity to compete on equal terms with the imported article, and the Rs. 34 lakhs which the duty would cost the consumer the Committee would devote to special measures for the development of the Indian salt supply. The report also recommends certain steps for the official regulation of prices.

Mysore Chemical Industry

The prospects of the development of chemical industry in the State of Mysore were recently reviewed at the Mysore Engineers' Conference. It is understood that the State is contemplating the manufacture of paper on a large scale. There is enough raw material in the State for its manufacture. The making of cement is another industry to which some attention is proposed to be given. The State contains good lime and clay deposits wherefrom cement of good quality can be manufactured not only for local consumption but also for export.

Havero Trading Company

The entire laboratory of the Havero Trading Co. of Bombay, which deals in aniline dyes and chemicals, was destroyed by fire. Most of the chemicals and acids, including dyes, were destroyed.

New Uses Required for Kauri Gum

ACTUATED by the present slackened demand, research is being undertaken in New Zealand to discover new commercial uses for kauri gum. According to the United States Trade Commissioner at Wellington, attempts to compound asbestos dust and kauri gum through chemical treatment have been made, hoping to produce a substance of commercial value, and so far efforts have been unsuccessful. The manufacture of waterproofing solutions with kauri gum as a constituent may possibly be undertaken, using unbleached kauri.

Methanol in Germany

ALTHOUGH Germany is a large producer and exporter of synthetic methanol, it still imports large quantities of the hardwood-distillation product. During 1930, for instance, 33,229 metric quintals were bought abroad (approximate value £85,000), compared with 37,800 metric quintals in 1929. An important feature of this trade is the fact that the bulk of the imports are admitted duty-free for conversion into export products, such as dyes. Czechoslovakia, Rumania, Yugoslavia, and Sweden are the leading contributors of the methanol imported.

From Week to Week

THE DIRECTORS of Val de Travers Asphalte Paving Co. have appointed Mr. Charles W. Wood, for many years secretary and assistant manager, to be general manager.

OFFICIAL statistics indicate that kelp exports from Norway in 1930 amounted to 3,288,000 kilos and 2,853,000 kilos in 1929, representing an increase of approximately 14 per cent.

MR. M. C. HARMAN and MAJOR ALDOM have resigned their seats on the board of the Dublin Distillers Co., and the vacancies been filled by Mr. A. D. Owen and Mr. Lionel Marks.

ON Monday, April 20, another new oil depot was opened in the South Docks, Sunderland—that of the British Oil Storage Co. There are now seven oil depots established in the port of Sunderland, with a total capacity of 37,000 tons. The new depot has a capacity of 5,000 tons.

THE ANNUAL EXHIBITION of Swedish products will be held in Göteborg, May 9 to 17. As on former occasions, the exhibits will be confined to Swedish products. In the chemical and allied products group, pharmaceutical products, oils, colours, dyes and lacquers will receive prominence.

IN RECENT OPERATIONS in Italy carried out in a semi-industrial plant installed at the Royal Salt Pans, at Cagliari salt pan mother liquors under the Ficai process produced bromine and other chemicals. This process, said to involve vacuum recovery of bromine, is claimed to be applicable to all bromide waters, the other materials needed for its operation being chiefly limestone of high purity and a source of heat.

WITH the object of testing the possibilities of Lake Eyre, in South Australia, as a source of potash salts, the Department of Mines intends to make experimental borings. If the work establishes the presence of salt the Department of Mines will sink bores to a depth of 1,000 feet. It is hoped to reveal the presence of potash salts. At present there are no known potash deposits in Australia.

RESEARCHES on the setting of red lead paints have been carried out in Germany by W. Wüllen-Scholten and are described in a recent issue of *Farben-Zeitung*. The viscosity time relationships for a considerable number of red lead paints made from non-setting and ordinary setting red lead, with various proportions of lead peroxide, and under different conditions as regards amount of linseed oil, degree of grinding, and method of mixing, have been determined.

THE AUTUMN MEETING of the Institute of Metals is to be held in Zürich, September 13–18, by invitation of the Schweizerische verband für Materialprüfung. The "autumn lecture," which is a feature of this meeting, will be delivered by Mr. U. R. Evans, on "Thin Films on Metals in Relation to Corrosion Problems." The first congress of the New International Association for Testing Materials, takes place in Zürich during the preceding week. Further particulars are obtainable from the Secretary, the Institute of Metals, 36, Victoria Street, London, S.W.1.

ACCORDING to the United States Commercial Attaché in Prague, the total consumption of alcohol in Czechoslovakia for the four months ending December 31, 1930, declined by 8·4 per cent., as compared with the same period of 1929. The consumption of pure alcohol decreased by 8,834 hectolitres, denatured alcohol by 3,516 hectolitres, alcohol for industrial purposes by 1,054 hectolitres, and the amount exported by 11,410 hectolitres. At the same time consumption of alcohol for the manufacture of vinegar increased by 765 hectolitres, and that used as motor fuel ("Dynalkol") by 5,825 hectolitres.

JAPAN'S rapidly advancing imports of methanol from 2,512,000 lb. (valued at £61,000) in 1927, to 6,111,000 lb. (£108,000) in 1929, are largely attributed to the increased demand of Japanese producers of formaldehyde. As yet, there is no important commercial production of methanol in Japan, and the two Japanese producers of formaldehyde depend almost exclusively on imported methanol as their raw material. Of the 4,170,000 lb. of formaldehyde (valued at £104,000) produced in Japan in 1929, 3,920,000 lb. (£98,000) were from imported methanol. It is reported that the imported formaldehyde competes on both quality and price basis. The 1929 imports of formaldehyde totalled 263,000 lb.

THE GERMAN BUNSEN SOCIETY is meeting at Vienna, May 25–28. There are a large number of papers to be presented embodying the results of contemporary work in the field of applied physical chemistry.

OVER 1,000 bleachers and dyers employed at the United Turkey Red factories in the Vale of Leven went on strike on Saturday, April 18, as a result of threatened wage reduction between 5 per cent. and 10 per cent.

A COURSE of three public lectures on the biological chemistry of colloids and protoplasm is to be delivered by Victor Cofman, D.Sc., at King's College, London, W.C.2, May 4, 11 and 18, at 5.30 p.m. Admission is free, without ticket.

CHILEAN imports of phosphorus during 1929 were 76 metric tons, practically all of which was used in the match industry. Of the imports during 1929, 69 tons were from Germany and 6 tons from Great Britain. There are two match manufacturers in Peru.

MR. O. F. C. BROMFIELD has resigned his appointment of Secretary to the British Chemical and Dyestuffs Traders Association, and Mr. F. G. Paige has been appointed his successor. The Council, in accepting Mr. Bromfield's resignation, has expressed its appreciation of his services over many years, and its good wishes for his future success.

A PAPER on "Stainless Metals" will be read by Sir Harold Carpenter, Ph.D., F.R.S., Professor of Metallurgy, Imperial College of Science and Technology, at the Royal Society of Arts, John Street, Adelphi, London, W.C.2, on Wednesday, April 29, at 8 p.m. The chair will be taken by Sir William J. Larke, K.B.E., Director of the National Federation of Iron and Steel Manufacturers.

IMPORTS of sulphur into the Union of South Africa for the first eight months of 1930 were 25,109 short tons, valued at £99,000, compared with 20,854 short tons, valued at £80,000 for the same period of the preceding year. The sulphur is used principally in making sulphuric acid intended for superphosphates and battery purposes. Considerable quantities of ground sulphur are also used in making lime-sulphur dip for treatment of sheep. The sugar industry of Natal consumes 2,500 to 3,000 tons annually.

IN MEXICO arsenic is produced as a by-product of the smelter at San Luis Potosi. This arsenic plant is said to be the largest in the world, with a capacity of 800 metric tons per month, but owing to diminished exports to the United States it now has 1,800 tons of white arsenic in storage and 23,000 tons of black arsenic in process of refinement. In the United States the railway companies, etc., are using arsenic in large quantities for weed-killers in their right-of-way, but the largest consumers are the insecticide manufacturers.

THE 230,000 pounds of citric acid exported from Belgium in 1930 was about a sixfold advance over the 1929 figure of 44,500 pounds. Evidently new foreign outlets were developed in 1930, as Germany, Argentina, and France, which received practically all of the 1929 shipments, only took approximately one-fifth of the 1930 exports. Despite the radical increase in its exports, however, Belgium was still importing citric acid in 1930. The 110,000 pounds brought into the country in that year was chiefly from Italy and the United Kingdom.

THE Federation of British Industries' Mission to Canada—the members of which are Colonel Sir James Lithgow (president of the Federation), Sir Arthur Duckham (deputy-president-elect), and Mr. Moir Mackenzie—left for Quebec on Saturday, April 18. This mission is going to Canada at the invitation of Mr. Stevens (Minister of Trade and Commerce for the Dominion), and is the first of its kind to be sent out by the representative body of British industry in Great Britain. It is visiting Canada in the hopes of finding out what views are held by leading industrialists and those behind industry in that country.

Obituary

MR. JAMES MCWHIRTER, research chemist and metallurgist, of the Panteg Steelworks, Glamorganshire.

THE DEATH is announced at Fairbourne, Barmouth, of Dr. Robert Samuel Heath, first Vice-Principal of Birmingham University, who retired from that office in 1918.

MR. THOMAS JOSEPH WHIFFEN, managing director of Thomas Atkinson and Son, Ltd., and chairman of Whiffen and Sons, Ltd., manufacturing chemists, Fulham. Age 81.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Accepted Specifications

341,389. DYES. I. B. Anderson, R. F. Thomson, J. Thomas, and Scottish Dyes, Ltd., Earl's Road, Grangemouth. Application date, July 5, 1929.

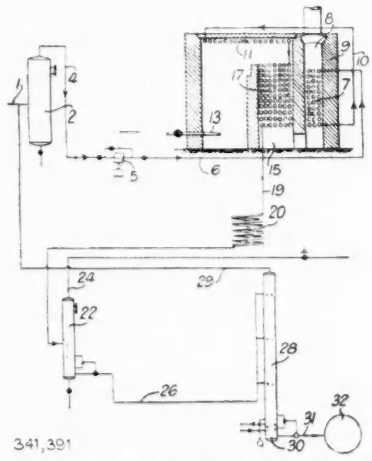
Amino-dibenzanthrones are obtained by subjecting nitro-dibenzanthronyls to acid reduction, *e.g.*, by heating with aniline sulphate, aniline and zinc dust. The aniline may be replaced by pyridine or quinoline or by solvents such as di- or tri-chlorbenzene, and the aniline sulphate by aniline hydrochloride, acetic acid or pyridine hydrochloride. Examples are given of the treatment of mono- and di-nitro-BzI : BzI^1-dibenzanthronyls, and nitro-2 : 2^1-dibenzanthronyl.

341,390. PURIFYING FATTY OILS. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, July 5, 1929.

Fatty oils such as crude cottonseed or linseed oil are emulsified with an inert neutral or acid liquid such as phosphoric or acetic acid or their salts, or with glycerol, water, or acid amides such as formamide, and if desired with finely divided charcoal. Soaps and mucilaginous substances may then be removed by sedimentation, filtering or centrifuging. The purified oil may be de-acidified by treating with a mist of water or a low-boiling solvent.

341,391. POLYMERISING HYDROCARBON GASES. C. R. Wagner, 35, East Wacker Drive, Chicago. Application date, July 8, 1929.

Motor fuels are obtained by polymerising unsaturated hydro-carbons containing ethylene and its homologues under a pressure of 300-1,000 lb. per sq. in. and temperature of 800°-1,000° F. The products are cooled and condensed while



341,391

still under pressure, and the condensate removed and the more volatile compounds separated and returned to the reaction zone. Gas passes from a tank 2 through compressor 5 to preheating tube 7 in the outlet flue 8 of a furnace 9. The gas then passes through a set of horizontal tubes 11 in the upper part of the furnace, and then through tubes 17. The products pass to a condenser 20 and accumulator tank 22, from which condensate passes to a tank 28. The more volatile compounds pass through pipe 29 back to the tank 2, and the remainder to a reservoir 32.

341,393. HYDROGEN. Union Chimique Belge, Soc. Anon., 61, Avenue Louise, Brussels. International Convention date, June 22, 1929.

Water vapour and hydrocarbons react to form a mixture of hydrogen and carbon monoxide. The heat is supplied by the combustion of gas and air in a separate circuit in a heat exchanger. The remaining heat of the burnt gases and the converted gases is recovered in heat regenerators. The apparatus is described.

341,394. SEPARATING OILS, FATS AND WAXES FROM ADSORPTIVE SILICATES. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 6, 1929.

The mixture of oil, fat or wax and adsorptive silicate is treated with a solid substance which is wetted more readily by the oils, etc., than is the silicate, in the presence of water. The added substance may be active carbon, bran, soya bean flour, sulphur, metallic sulphides or oxides. Thus, an oleiferous fuller's earth is treated with active carbon in the presence of water and emulsifying agents. The oil and carbon separate as an upper layer, the separation being assisted by adding neutral electrolytes such as common salt or magnesium sulphate. The oil and carbon are separated by filtration.

341,397. DYES. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 11, 1929.

The alkaline reduced dyestuffs 4-nitro-1-aminobenzene-2-dialkyl- or alkylaryl-sulphonamides β-naphthylamine sulphonic acid or a derivative are acylated to obtain monoazo dyes, or the diazo compound of a 4-acylamino-1-aminobenzene-2-dialkyl- or arylalkyl-sulphonamide is coupled with a β-naphthylamine sulphonic acid or a derivative. Examples describe the dyestuffs 4-acetylamino-1-aminobenzene-2-sulphoethylanilide 2 : 8 : 6-acid or its N-methyl derivative or 2-naphthylamine-7-sulphonic acid.

341,400. DYES. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, October 26, 1928. Addition to 305,679.

2-Benzanthronyl-1-amino-anthraquinones containing at least one aliphatic acylamino group in the anthraquinone residue and having the 2-position free, are treated with acid condensing agents such as concentrated or fuming sulphuric acid, chlorsulphonic acid and anhydrous aluminium chloride. The acylamino group may be saponified and the amino derivatives treated with acylating agents or condensed with vat dyestuffs containing halogen, or diazotised and subjected to the Sandmeyer reaction. Examples are given of the condensation of 2^1-benzanthronyl-1-amino-4-acetylamino-anthraquinone, mono-2^1-benzanthronyl-1 : 4-diamino-anthraquinone, 2^1-benzanthronyl-1-amino-4-benzoylamino-anthraquinone, and the further treatment of some of the products is described.

341,402. ALICYCLIC LACTONES. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, October 5, 1928.

A Bz-alkoxy-α-tetralone or a Bz-homologue is condensed with an oxalic acid ester and the resulting Bz-alkoxy-8-tetralone-7-ketocarboxylic acid ester is heated to split off carbon monoxide. An alkali metal compound of the Bz-alkoxy-8-tetralone-7-carboxylic acid ester formed is treated with an α-halogen-acetic acid or albylacetic acid ester, the condensation product saponified with alkali, splitting off carbon dioxide, and the alkyl radicle is eliminated from the alkoxy group by means of aluminium chloride to give Bz-hydroxy-8-tetralone-7-acetic acid or -alkyl-acetic acid, which is finally reduced to the corresponding lactone. (α-tetralone is 8-keto-5 : 6 : 7 : 8-tetrahydronaphthalene.) An example is given.

341,405. SODIUM SALTS OF AROMATIC ARSINIC ACIDS. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, October 9, 1928.

3-Acylamino-4-phenol-1-arsinic acid is dissolved in at least double the equivalent quantity of an aqueous caustic soda or sodium carbonate solution. The disodium salt is precipitated with alcohol, acetone or common salt solution. Examples are given.

341,415. MOTOR FUELS. A. Richmond, 73, Basinghall Street, London. Application date, October 10, 1929.

Low temperature tar is distilled below 150° C. in a current of nitrogen to remove volatile constituents, and a further fraction distilled at the same temperature by reducing the pressure or passing in steam. The oil obtained is washed free from tar acids and bases, dried and added to a hydrocarbon motor fuel as an anti-knocking ingredient.

341,420. ARTIFICIAL RESINS. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, October 14, 1929.

Styrol or its homologues is polymerised in the presence of cyclohexanol or its homologues, and an organic acid or anhydride or a plasticising agent such as a high-boiling ester, ether, ketone, etc. The products are clear and transparent.

341,432. DYES. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, July 15, 1929.

2-Mercapto-1-methylanthraquinone or 2-halogen-1-methylanthraquinone with a sulphide, thocyanate, hydroxide, oxide, or weak acid salt of alkali or alkaline earth metals, are fused with sulphur to obtain vat dyes. Reference is directed by the Comptroller to Specifications 4536/10 and 4537/10.

341,447. SYNTHETIC RESINS, CELLULOSE ESTERS. H. A. Bruson, 222, West Washington Square, Philadelphia, U.S.A., and Chemische Fabriken Dr. K. Albert Ges., Amöneburg, Biebrich, Wiesbaden-on-Rhine, Germany. Application date, October 11, 1929.

Polyhydric alcohols are condensed with aliphatic polybasic acids having more than six carbon atoms linked together in a normal straight chain, *e.g.*, sebacic acid, pimelic acid, suberic acid, and azelaic acid. The condensation takes place in three stages, the first being thin, syrupy and soluble in acetone; the second soft, flexible, rubbery, and soluble in acetone or ethyl acetate, but insoluble in benzol; and the third soft, elastic and very tough, and insoluble in organic solvents. Examples are given, the products being suitable as coatings for leather, fabrics, paper, etc., and for photographic films. Mixtures of the products with cellulose esters are also described.

341,456. DIETHYLENE GLYCOL-DINITRATE. A. Hough, 250, Aycrigg Avenue, Passaic, N.J., U.S.A. Application date, September 11, 1929.

Diethylene glycol is treated with a mixture of nitric acid 30—60 per cent., sulphuric acid 35—60 per cent., and water 3—12 per cent., the mixture being kept below 10° C. The diethylene glycol dinitrate is employed in the explosives industry, alone or mixed with other explosives.

341,461. DYES. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany.

A diazotised aromatic amine is coupled with an ω-halogenacylamino-naphthol sulphonic acid or a derivative, which is obtained from the corresponding peri-aminonaphthol sulphonic acid and the corresponding ω-halogen acid chloride. Examples describe the dyestuffs aniline or *p*-toluidine → ω-chloracetyl-H acid, aniline, *m*-aminobenzaldehyde or 4-ethylacetylamino-2-aminotoluene → ω-chloracetyl-K acid, *o*-toluidine → ω-chloracetyl-J acid, aniline → ω-chloracetyl-2 : 8 : 6-acid and aniline → ω-chlorpropionyl-K acid.

341,549. DYE INTERMEDIATES. Kalle and Co., Akt.-Ges., 23, Rheinstrasse, Biebrich-on-Rhine, Germany. International Convention date, October 19, 1928.

An aminonaphthol or a sulphonic acid thereof having a free *o*- or *p*- position to the OH group is treated with a cyanamide, *e.g.*, 1 : 5-aminonaphthol with dicyandiamide to obtain 5-naphthol-1-biguanidine, and 1 : 7-aminonaphthol hydrochloride with cyanamide to obtain 7-naphthol-1-guanidine.

341,553. ANTHRAQUINONE HOMOLOGUES. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 19, 1929.

The condensation products of 1 molecular proportion of benzoquinone with 2 molecular proportions of two different 1 : 3-butadienes or the rearrangement products thereof, or the tetrahydro-anthrahydroquinones, tetrahydro-anthraquinones or quinhydrones obtained by mild dehydrogenation are treated in acid media with ferric, cupric or mercuric salts. In an example, 2-methyl-anthraquinone is obtained by heating the condensation product from benzoquinone, 1 : 3-butadiene and isoprene with ferric chloride in water under pressure.

341,554. INDOLES. Imperial Chemical Industries, Ltd., Millbank, London. H. A. Piggott and E. H. Rodd, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, October 22, 1929.

Methylketol (2-methylindole) is treated with methyl alcohol and anhydrous hydrochloric acid to obtain 2 : 3-dimethylindole, and the latter similarly yields 1 : 3 : 3-trimethyl-2-methyleneindoline. If aqueous hydrochloric acid is used in the first case, the main product is 1 : 3-trimethyl-2-methylene-indoline.

341,560. DESTRUCTIVE HYDROGENATION. Chemical Reactions, Ltd., 25, Victoria Street, London. From L. von Szeszich, 12, Neuhauser Strasse, Constance, Germany. Application date, October 22, 1929.

Tars, tar oils, mineral oils, etc., are subjected to a pretreatment by heating under pressure in the presence of inactive material such as pumice, coké, Raschig rings, clay or porcelain, and preferably in the presence of hydrogen. The ash content is thereby deposited on the inactive material, and an ash-free material passes to the main hydrogenation chamber.

341,570. AMMONIUM SULPHATE AND BISULPHATE. H. D. Elkington, London. From Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij, 30, Carel van Bylandtlaan, The Hague. Application date, October 25, 1929.

Ammonia and sulphur dioxide, or ammonium sulphite or bisulphite are oxidised with air in the presence of nitrogen oxides (except nitrous oxide) or salts of nitro-hydroxylaminic acid, which yield nitrogen oxides, with or without water or water vapour, at a temperature of 80° C. When gaseous mixtures are used, solid ammonium sulphate is directly obtained.

341,584. ABSORBING AND REGENERATING CARBON BISULPHIDE AND CARBON OXYSULPHIDE; PIPERIDINE COMPOUNDS. Technical Research Works, Ltd., and E. J. Lush, 4, Milner Street, Chelsea, London. Application date, October 31, 1929.

Coal-gas and hydrogen are freed from carbon bisulphide and carbon oxysulphide by treatment with piperidine or its homologues. The piperidine is dissolved or suspended in water, pyridine, hydrocarbon oils, alcohols, or ketones. Piperidine with ammonia and copper salts may also be used for absorbing carbon monoxide from gases, or with gas oil for recovering benzol, or it may be used as vapour. The complex compounds are then treated with carbon dioxide under pressure to form piperidine carbonate and liberate the sulphur compound, or alternatively, with acid.

341,598. HETEROCYCLIC AZO COMPOUNDS. A. Carpmael, London. From Schering-Kahlbaum Akt.-Ges., 170, Müllerstrasse, Berlin. Application date, November 6, 1929.

Bactericides are obtained by coupling a diazotised amino derivative of a heterocyclic compound with a mono- or diamino-pyridine or a derivative. Thus, 2-chloro-5-aminopyridine is diazotised and coupled with 2 : 6-diaminopyridine to obtain 2 : 6-diamino-2^1-chloro-3 : 5^1-azopyridine. Other examples are given.

341,612. DYE INTERMEDIATES. W. W. Groves, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, November 13, 1929.

1-Aminobenzene-2-sulphonic acids substituted in the 3 4 and 6 positions by alkyl, O-alkyl, O-aryl, O-aralkyl, CO-aryl, SO_2-aryl, NO_2, SO_3, H, COOH or halogen, are obtained by treating the corresponding amine with a halogen sulphonic acid in the absence of water and in the presence of diluents such as high-boiling aliphatic hydrocarbons, aliphatic substitution products of aliphatic hydrocarbons and of benzene, toluene, xylene, carbon tetrachloride, *o*-dichlorbenzene or nitrobenzene. The sulphonating agent may be chloro- or fluoro-sulphonic acids. A large number of these acids are described.

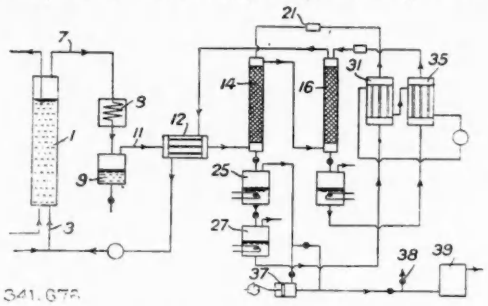
341,650. CATALYTIC HYDROGENATION AND DEHYDROGENATION. Orbis Products Trading Co., 215, Pearl Street, New York. International Convention date, December 5, 1928.

Piperitone is subjected to the action of a dehydrogenating catalyst such as reduced nickel at boiling temperature, but without hydrogen. One half of the material is dehydrogenated to thymol and the liberated hydrogen hydrogenates the remainder to menthone.

341,676. PURIFYING HYDROGEN; DESTRUCTIVE HYDROGENATION. J. Crowe and K. Gordon, Norton Hall, The Green, Norton-on-Tees, and Imperial Chemical Industries, Ltd., Millbank, London. Application date, December 17, 1929.

Gas leaving a destructive hydrogenation chamber 1 passes through a condenser 8 and receiver 9, and the impure hydrogen passes on through cooler 12 where it is cooled to —20° C. to washing towers 14, 16 supplied with cold gas oil, where ethane,

with or without methane is absorbed. The oil passes to vessels 25, 27 where the pressure is released and the gas liberated passes to a cracking plant 39 for the production of



hydrogen. The oil returns through coolers 31, 35 to the towers 14, 16.

341,684. OXIDATION OF HYDROGEN SULPHIDE AND ITS SALTS. A. G. Bloxam, London. From R. Kuhn, 17, Tannenstrasse, Zurich, Switzerland. Application date, December 21, 1929.

Industrial gases are washed with water or alkali and the solution of hydrogen sulphide or sodium sulphide or hydrosulphide is treated with gases containing oxygen in the presence of complex salts of heavy metals with cyclic organic compounds, to effect oxidation to sulphur or sodium thiosulphate. Examples of the catalyst employed include a mixture of an alcoholic solution of 1-oxyanthraquinone with ammoniacal copper hydroxide, an alcoholic solution of alizarin with alcoholic manganese acetate, and an alcoholic solution of quinizarine and pyridine with alcoholic copper acetate.

341,725. SULPHUR TRIOXIDE. E. B. Maxted, 38, Walliscote Road, Weston-super-Mare. Application date, January 24, 1930.

Sulphur dioxide or readily oxidisable compounds such as hydrogen sulphide are oxidised to sulphur trioxide by the aid of a catalyst consisting of a vanadate of tin or bismuth. An inert carrier for the catalyst may be employed.

Specifications Accepted with Date of Application

345,935. Resinous products, Manufacture of. Toledo Scale Manufacturing Co. May 15, 1929.

345,939. Polymerized hydrocarbons, Manufacture of. Standard Telephones and Cables, Ltd., and W. E. Hugh. December 16, 1929.

345,989. Cellulose derivatives and their manufacture. H. Dreyfus. December 23, 1929.

345,997. Dry separation of solid materials. A. T. Masterman. December 30, 1929.

346,009. Titanium tanning preparations, Manufacture of. I.G. Farbenindustrie Akt.-Ges. January 2, 1929.

346,038. Phosphorus or oxygen compounds and gaseous mixtures, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). Soc. d'Etudes Scientifiques et d'Entreprises Industrielles. January 9, 1929.

346,040. Solutions, plasticized products, and the like from cellulose ethers, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). January 9, 1930.

346,079. Preserving rubber. Goodyear Tire and Rubber Co. March 14, 1929.

346,116. White titanium pigments, Manufacture of. I.G. Farbenindustrie Akt.-Ges. March 2, 1929.

346,118. Physiologically active quinazoline derivatives, Preparation of. Soc. Anon. Legoda Prodotti Chimicie Farmaceutici. May 30, 1929.

346,152–3. Purifying hydrocarbons. M. Mercurio. October 30, and June 22, 1929.

346,208. Dilithium alkali citrates, Manufacture of. W. W. Triggs. (*J. A. Wülfing*). May 17, 1930.

346,221. Acrolein, Manufacture of. Schering-Kahlbaum Akt.-Ges. June 15, 1929.

346,222. Piperidine, Manufacture of. Schering-Kahlbaum Akt.-Ges. June 21, 1929.

346,237. Primary alcohols, Production of. H. T. Bohme Akt.-Ges. September 23, 1929.

346,243. Dyestuffs, Manufacture of. Durand and Huguenin Akt.-Ges. July 19, 1930. Addition to 301,329.

346,246. Pyridine derivatives, Manufacture of. E. Koenigs and H. Greiner. July 23, 1929.

346,247. Catalytic conversion of ammonia into nitric oxide. E. Jost. August 3, 1929.

346,226. Non-corrodible alloys. C. Contal. June 21, 1929.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

Bindley, W. T. R. Catalytic treatment of substances. 11,520. April 18.

Blagden, J. W., Clark, G. C. H., and Howards and Sons, Ltd. Dehydrogenation of organic substances. 11,456. April 17.

Blumenfeld, J. Preparation of titanium oxide. 11,402. April 17.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of condensation products. 10,855. April 13.

—— Mnaufacture of hydroxycarboxylic acids of tetrahydronaphthocarbazoles. 11,052. April 14.

Coles, S. O. Cowper-. Protective coating for iron, etc. 11,236. April 16.

Compagnie Française de Transformation Métallurgique. Manufacture of zinc oxide. 11,101. April 15. (France, April 15, 1930.)

Corbett, E. G. Manufacture of ester acetates. 10,812. April 13.

Crockatt, W. C., Crockatt and Sons, Ltd., W. Apparatus for measuring concentration of liquids. 11,379. April 17.

Crundall, S. F. W., and P. Spence and Sons, Ltd. Preparation of titanium compounds. 10,940. April 14.

Du Pont de Nemours and Co., E. I. Auto-oxidizable substances. 10,801. April 13.

Elektra Akt.-Ges. für Elektrotechnik, and Wilke, C. Devices for drying ammonium sulphate, etc. 10,803. April 13.

Franke, M. Installations for liquefaction and separation of gases containing carbon dioxide. 11,195. April 15. (France, April 15, 1930.)

General Carbonalpha Co. Manufacture of carbon. 11,194. April 15. (France, April 16, 1930.)

Goodyear Tire and Rubber Co. Method of preserving rubber. 11,170. April 15. (United States, May 29, 1930.)

—— Method of preserving rubber, etc. 11,171. April 15. (United States, May 24, 1930.)

Groves, W. W., and I.G. Farbenindustrie Akt.-Ges. Manufacture of artificial silk. 11,008. April 14.

—— Manufacture of therapeutically-active compounds. 11,014. April 14.

—— Manufacture of wetting-agents, etc. 11,172. April 15.

—— Manufacture of coloured nitrocellulose lacquers, etc. 11,289, 11,290. April 16.

I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Manufacture of pentaerythritol. 10,835. April 13.

—— Treatment of vegetable fibres. 10,836. April 13.

—— Apparatus for thermal conversion of hydrocarbons. 10,837. April 13.

—— Separation of unsaturated hydrocarbons from gas mixtures containing same. 11,294. April 16.

—— Apparatus for carrying out catalytic reactions. 11,295. April 16.

—— Manufacture of assistants for textile, etc., industries. 11,549. April 18.

I.G. Farbenindustrie Akt.-Ges. Manufacture of splinterless glass. 11,454. April 17. (Germany, April 17, 1930.)

—— Manufacture of safety glass, etc. 11,455. April 17. (Germany, April 19, 1930.)

Imperial Chemical Industries, Ltd. Recovery of oil from sludges. 10,908. April 13.

—— Removal of dust, etc., from flue gases. 11,075. April 14.

—— Thomson, R. F., Shaw, C., and Semple, G. C. Production of anthraquinone dyestuffs, etc. 11,076. April 14.

—— Manufacture of substances for wetting, etc., agents. 11,077. April 14.

Imperial Chemical Industries, Ltd. Core binders. 11,078. April 14.

—— Thomson, R. F., and Shaw, C. Anthraquinone intermediates and dyestuffs. 11,301. April 16.

—— Carrying-out cyclic high-pressure gas reactions. 11,302. April 16.

Kilner, A. H. Method of protecting metal, etc., from acid or acid fumes, etc. 11,243. April 16.

Liebster, A. Production of ethers of carbohydrates. 10,888. April 13. (Germany, May 16, 1930.)

Margoles, J. Production of alkaline cyanamide. 11,423. April 17. (France, April 17, 1930.)

Martin, S. Process of producing pure white mono-calcium orthophosphate. 10,847. April 13.

Naamlooze Vennootschap Chemische Fabriek Servo, and Rogenbrook, M. D. Sulphonating higher fatty acids, etc. 11,505. April 17. (January 21, 1930.) (Holland, January 22, 1929.)

Raschig, Ges. F. Process for making chlorobenzene. 10,819. April 13. (Germany, April 12, 1930.)

Silica Gel Corporation and Tennant, W. J. Manufacture of silica gel, etc. 11,084. April 14.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£18 15s. per ton d/d address U.K. in casks.
ACID CHROMIC.—1s. per lb., less 2½% d/d U.K.
ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d, according to purity, strength and locality.
ACID NITRIC, 80° Tw.—Spot, £20 to £25 per ton makers' works, according to district and quality.
ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
AMMONIA (ANHYDROUS).—Spot, 10d. per lb., d/d in cylinders.
AMMONIUM BICHROMATE.—8⅛d. per lb. d/d U.K., or 8d. c.i.f. export.
BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.
BLEACHING POWDER, 35/37%.—Spot, £7 19s per ton d/d station in casks, special terms for contracts.
BORAX, COMMERCIAL.—Crystals, £13 10s. per ton; granulated, £12 10s. per ton; powder, £14 per ton. (Packed in 1 cwt. bags. carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards.)
CALCIUM CHLORIDE (SOLID), 70/75%.—Spot, £4 15s. to £5 5s. per ton d/d station in drums.
CHROMIUM OXIDE.—9d. to 9½d. per lb. according to quantity d/d U.K.
CHROMETAN.—Crystals, 3¼d. per lb. Liquor, £18 12s. 6d. per ton d/d U.K.
COPPER SULPHATE.—£25 to £25 10s. per ton.
METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 7d. to 1s. 11d. per gall., pyridinised industrial, 1s. 9d. to 2s. 1d. per gall.; mineralised, 2s. 8d. to 2s. 11d. per gall. 64 O.P., 1d. extra in all cases. Prices according to quantity.
NICKEL SULPHATE.—£38 per ton d/d.
NICKEL AMMONIA SULPHATE.—£38 per ton d/d.
POTASH CAUSTIC.—£30 to £33 per ton.
POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—4½d. per lb. nett d/d U.K., discount according to quantity; ground ½d. per lb. extra.
POTASSIUM CHLORATE.—3¾d. per lb. ex-wharf, London, in cwt. kegs.
POTASSIUM CHROMATE.—8½d. per lb. d/d U.K., or 8d. c.i.f. export.
SALAMMONIAC.—Firsts lump, spot, £40 17s. 6d. per ton d/d address in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.
SALT CAKE, UNGROUND.—Spot, £3 10s. per ton d/d station in bulk.
SODA ASH, 58%.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.
SODA CAUSTIC, SOLID, 76/77%.—Spot, £14 10s. per ton, d/d station.
SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2-cwt. bags.
SODIUM ACETATE 97/98%.—£21 per ton.
SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.
SODIUM BICHROMATE CRYSTALS (CAKE AND POWDER)—3½d. per lb. nett d/d U.K., discount according to quantity. Anhydrous ¾d. per lb. extra.
SODIUM BISULPHITE POWDER, 60/62%.—£16 10s. per ton delivered 1-cwt. iron drums for home trade.
SODIUM CHLORATE.—2¾d. per lb.
SODIUM CHROMATE.—3⅞d. per lb. d/d U.K., or 3¼d. c.i.f. export.
SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.
SODIUM PHOSPHATE.—£14 per ton, f.o.r. London, casks free.
SODIUM SILICATE, 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.
SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d address in bags.
SODIUM SULPHIDE SOLID, 60/62%.—Spot, £10 5s. per ton, d/d station in drums. Crystals—Spot, £7 10s. per ton, d/d station in returnable casks.
SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton, d/d station in kegs. Commercial—Spot, £9 per ton, d/d station in bags.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—5d. to 6¼d. per lb. Crude 60's 1s. to 1s. 1d. per gall. August/December.
ACID CRESYLIC 99/100.—1s. 9d. to 1s. 10d. per gall. B.P., 3s. 6d. per gall. 97/99.—Refined, 2s. 2d. to 2s. 3d. per gall. Pale, 98%, 1s. 8d. to 1s. 9d. Dark, 1s. 4d. to 1s. 4½d.
ANTHRACENE OIL, STRAINED (GREEN OIL).—4½d. to 4¾d. per gall.
BENZOLE.—Prices at works: Crude, 5½d. to 6½d. per gall.; Standard Motor, 1s. to 1s. 1d. per gall. 90%.—1s. 1d. to 1s. 2d. per gall. Pure, 1s. 4d. to 1s. 5d. per gall. (The above prices were operative from March 3 last.)
TOLUOLE.—90%, 1s. 8d. per gall. Pure, 1s. 10d. per gall.
XYLOL.—1s. 7d. to 1s. 8d. per gall. Pure, 1s. 10d to 1s. 11d. per gall.
CREOSOTE.—Standard specification, for export, 5dd. to 5¼d. net per gall. f.o.b.; for Home, 4d. per gall. d/d.
NAPHTHA.—Solvent, 90/160, 1s. 3d. per gall. Solvent, 95/160, 1s. 3d. to 1s. 4d. per gall. Solvent, 90/190, 1s. to 1s. 2d. per gall.
NAPHTHALENE.—Purified Crystals, £11 11s. per ton.
PITCH.—Medium soft, 45s. per ton, in bulk at makers' works.
PYRIDINE.—90/140, 3s. 3d. to 3s. 6d. per gall. 90/160, 3s. 3d. to 3s. 6d. per gall. 90/180, 1s. 9d. to 2s. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:—

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.
ACID ANTHRANILIC.—6s. per lb. 100%.
ACID GAMMA.—Spot, 3s. 6d. per lb. 100% d/d buyer's works.
ACID H.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.
ACID NAPHTHIONIC.—1s. 2d. per lb. 100% d/d buyer's works.
ACID NEVILLE AND WINTHER.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.
ACID SULPHANILIC.—Spot, 8½d. per lb. 100% d/d buyer's works.
ANILINE OIL.—Spot, 8½d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8½d. per lb. d/d buyer's works, casks free.
BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra, d/d buyer's works.
BENZIDINE BASE.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.
BENZOIC ACID.—Spot, 1s. 8½d. per lb. d/d buyer's works.
o-CRESOL 30/31° C.—£2 6s. 5d. per cwt., in 1-ton lots.
m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.
p-CRESOL 34·5° C.—1s. 9d. per lb., in ton lots.
DICHLORANILINE.—2s. 5d. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., packages extra, d/d buyer's works.
DINITROBENZENE.—7½d. per lb.
DINITROCHLORBENZENE.—£74 per ton d/d.
DINITROTOLUENE.—48/50° C., 7d. per lb.; 66/68° C., 7¾d. per lb.
DIPHENYLAMINE.—Spot, 1s. 8d. per lb. d/d buyer's works.
a-NAPHTHOL.—Spot, 1s. 11d. per lb. d/d buyer's works.
B-NAPHTHOL.—Spot, £65 per ton in 1 ton lots, d/d buyer's works.
a-NAPHTHYLAMINE.—Spot, 1s. per lb. d/d buyer's works.
B-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.
o-NITRANILINE.—5s. 11d. per lb.
m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.
NITROBENZENE.—Spot, 6½d. per lb., 5-cwt. lots, drums extra, d/d buyer's works.
NITRONAPHTHALENE.—9d. per lb.
R. SALT.—Spot, 2s. per lb. 100% d/d buyer's works.
SODIUM NAPHTHIONATE.—Spot, 1s. 6d. per lb. 100% d/d buyer's works.
o-TOLUIDINE.—Spot, 8d. per lb., drums extra, d/d buyer's works.
p-TOLUIDINE.—Spot, 1s. 6d. per lb. d/d buyer's works.
m-XYLIDINE ACETATE.—3s. 3d. per lb., 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £7 5s. to £7 10s. per ton. Grey, £13 per ton. Liquor, 9d. per gall.
ACETONE.—£63 to £65 per ton.
CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.
IRON LIQUOR.—24°/30° Tw., 10d. to 1s. 2d. per gall.
RED LIQUOR.—16° Tw., 8½d. to 10d. per gall.
WOOD CREOSOTE.—1s. 9d. per gall., unrefined.
WOOD NAPHTHA, MISCIBLE.—2s. 9d. to 2s. 11s. per gall., according to quantity. Solvent, 3s. 9d. per gall.
WOOD TAR.—£4 to £5 per ton.
BROWN SUGAR OF LEAD.—£32 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 1d. per lb., according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.
ARSENIC SULPHIDE, YELLOW.—1s. 7d. to 1s. 9d. per lb.
BARYTES.—£6 to £7 10s. per ton, according to quality.
CADMIUM SULPHIDE.—4s. 6d. to 5s. per lb.
CARBON BISULPHIDE.—£26 to £28 per ton, according to quantity; drums extra.
CARBON BLACK.—3d. to 4d. per lb., ex wharf.
CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity: drums extra.
CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.
DIPHENYLGUANIDINE.—2s. 6d. per lb.
INDIARUBBER SUBSTITUTES, WHITE.—4⅝d. to 5⅜d. per lb.; Dark, 4⅛d. to 4⅞d. per lb.
LAMP BLACK.—£28 per ton, barrels free.
LITHOPONE, 30%.—£19 to £21 per ton.
SULPHUR.—£9 10s. to £13 per ton, according to quality.
SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.
SULPHUR PRECIP. B.P.—£55 to £60 per ton, according to quantity.
VERMILION, PALE OR DEEP.—6s. 6d.-7s. per lb.
ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACETANILIDE.—1s. 4d. per lb. for 1-cwt. lots.
ACID, ACETIC, PURE, 80%.—£37 5s. per ton d/d address U.K. in casks.
ACID, ACETYL SALICYLIC.—2s. 7d. to 2s. 9d. per lb., according to quantity.
ACID, BENZOIC B.P.—1s. 9d. to 1s. 10d. per lb., for synthetic product. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.
ACID, BORIC B.P.—Crystal, £31 per ton; powder, £32 per ton; For one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—1s. 0½d. per lb., less 5%.
ACID, GALLIC.—2s. 11d. per lb. for pure crystal, in cwt. lots.
ACID, MOLYBDIC.—5s. 3d. per lb. in ½-cwt. lots. Packages extra. Special prices for quantities and contracts.
ACID, PYROGALLIC, CRYSTALS.—7s. 6d. per lb. for 28-lb. lots, Resublimed, 8s. 6d. per lb. for 28-lb. lots.
ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 8d. per lb. Technical.—1s. to 1s. 2d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—11⅞d. per lb., less 5%.
AMIDOL.—7s. 6d. to 11s. 3d. per lb., according to quantity.
AMMONIUM BENZOATE.—3s. 9d. per lb.
AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5-cwt. casks. Resublimated, 1s. per lb.
AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ½-cwt. lots. Packages extra. Special prices for quantities and contracts.
ARGENT. NITRAS, CRYSTALS.—1s. 1d. per oz.
ATROPHINE SULPHATE.—7s. to 7s. 6d. per oz., according to quantity.
BARBITONE.—5s. 9d. to 6s. per lb.
BISMUTH CARBONATE.—6s. 9d. per lb.
BISMUTH CITRATE.—8s. per lb.
BISMUTH SALICYLATE.—7s. 3d. per lb.
BISMUTH SUBNITRATE.—6s. per lb.
BISMUTH NITRATE.—Cryst. 5s. per lb.
BISMUTH OXIDE.—9s. 10d. per lb.
BISMUTH SUBCHLORIDE.—9s. 7d. per lb.
BISMUTH SUBGALLATE.—7s. 3d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W. Qts. 11d. per lb. Liquor Bismuth B.P., in W. Qts., 1s. 2d. per lb.; 6 W. Qts., 11½d. per lb.; 12 W. Qts., 10d. per lb.; 36 W. Qts., 9½d. per lb.
BORAX B.P.—Crystal, £21 10s. per ton; powder, £22 per ton; for one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
BROMIDES.—Ammonium, 1s. 9d. per lb.; potassium, 1s. 4½d. per lb.; granular, 1s. 5d. per lb.; sodium, 1s. 7d. per lb. Prices for 1-cwt. lots.
CAFFEIN, PURE.—6s. 6d. per lb.
CAFFEIN CITRAS.—5s. per lb.
CALCIUM LACTATE.—B.P., 1s. to 1s. 6d. per lb., according to quantity.
CAMPHOR.—Refined flowers, 2s. 10d. to 3s. per lb., according to quantity; also special contract prices.
CHLOROFORM.—2s. 3d. per lb., according to quantity.
EPHEDRINE, PURE.—12s. 6d. to 13s. 6d. per oz.
EPHEDRINE HYDROCHLORIDE.—9s 9d. to 10s. 6d. per oz.
EPHEDRINE SULPHATE.—9s. 9d. to 10s. 6d. per oz.
ERGOSTEROL.—2s. 6d. per gm.
ETHERS.—S.G. ·730—1s. to 1s. 1d. per lb., according to quantity; other gravities at proportionate prices.
FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.
GLUCOSE, MEDICINAL.—1s. 6d. to 2s. per lb. for large quantities.
HEXAMINE.—2s. 3d. to 2s. 6d. per lb.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 3s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 11d. to 3s. 4d. per lb.; potassium, 3s. 2d. to 3s. 7d. per lb.; sodium, 3s. 1d. to 3s. 6d. per lb.; for 28-lb. lots.
IRON AMMONIUM CITRATE.—B.P., 1s. 11d. per lb., for 28-lb. lots. Green, 2s. 6d. per lb., list price. U.S.P., 2s. 9d. per lb. list price.
IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.
IRON QUININE CITRATE.—B.P., 8½d. to 8¾d. per oz., according to quantity.
MAGNESIUM CARBONATE.—Light B.P., 36s. per cwt.
MAGNESIUM OXIDE.—Light Commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 14s. per lb. net; Synthetic, 8s. 6d. to 12s. per lb.; Synthetic detached crystals, 8s. 6d. to 10s. per lb., according to quantity; Liquid (95%), 9s. per lb.
MERCURIALS B.P.—Up to 1-cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 3d. to 1s. 5d. per lb.
PARAFORMALDEHYDE.—1s. 8d. per lb.
PARALDEHYDE.—1s. 1d. per lb.
PHENACETIN.—3s. 9d. to 4s. 1d. per lb.
PHENAZONE.—7s. 2d. per lb. for 1 cwt. lots.
PHENOLPHTHALEIN.—5s. to 5s. 2½d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—82s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P., 1s. 9d. per lb. for 28-lb. lots.
POTASSIUM FERRICYANIDE.—1s. 7½d. per lb., in 125-lb. kegs.
POTASSIUM IODIDE.—16s. 8d. to 17s. 9d. per lb., as to quantity.
POTASSIUM METABISULPHITE.—50s. per cwt. d/dLondon, kegs free.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
QUININE SULPHATE.—1s. 8d. per oz. for 1,000-oz. lots.
SACCHARIN.—43s. 6d. per lb.
SALICIN.—16s. 6d. to 17s. 6d. per lb., according to quantity.
SILVER NITRATE.—10d. per oz. for 500-oz. lots, sticks, 2d. per oz. extra.
SODIUM BARBITONUM.—8s. 6d. to 9s. per lb. for 1-cwt. lots.
SODIUM BENZOATE B.P.—1s. 6½d. per lb. for 1-cwt. lots.
SODIUM CITRATE.—B.P.C. 1911, 1s. 6d. per lb. B.P.C. 1923, and U.S.P., 1s. 10d. per lb. for 28-lb. lots.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—80s. per cwt. net, ton lots, d/s of 5 cwt. Crystals, 2s. 6d. per cwt. extra.
SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 3d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£26 to £28 per ton, according to quantity. Delivered U.K.
STRYCHNINE, ALKALOID CRYSTAL, 2s. per oz.; hydrochloride, 1s. 9½d. per oz.; nitrate, 1s. 8d. per oz.; sulphate, 1s. 9d. per oz., for 1,000-oz. quantities.
TARTAR EMETIC, B.P.—Crystal or powder, 1s. 9d. to 2s. per lb.
THYMOL.—Puriss, 6s. to 7s. per lb., according to quantity. Natural, 12s. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.
AUBEPINE (EX ANETHOL).—9s. per lb.
AMYL ACETATE.—2s. 3d. per lb.
AMYL BUTYRATE.—4s. 9d. per lb.
AMYL CINNAMIC ALDEHYDE.—9s. per lb.
AMYL SALICYLATE.—2s. 6d. per lb.
ANETHOL (M.P. 21/22° C.).—5s. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—1s. 9d. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 9d. per lb.
BENZYL BENZOATE.—2s. 2d. per lb.
CINNAMIC ALDEHYDE NATURAL.—11s. 9d. per lb.
COUMARIN.—12s. per lb.
CITRONELLOL.—6s. 6d. per lb.
CITRAL.—6s. 6d. per lb.
ETHYL CINNAMATE.—6s. 9d. per lb.
ETHYL PHTHALATE.—2s. 6d. per lb.
EUGENOL.—8s. 9d. per lb.
GERANIOL.—6s. to 10s. per lb.
HELIOTROPINE.—5s. 6d. per lb.
LINALYL ACETATE, EX BOIS DE ROSE.—7s. 6d. per lb. Ex Shui Oil, 7s. 6d. per lb.
METHYL ANTHRANILATE.—6s. 3d. per lb.
METHYL BENZOATE.—4s. 3d. per lb.
PHENYL ETHYL ACETATE.—10s. per lb.
PHENYL ETHYL ALCOHOL.—8s. 3d. per lb.
RHODINOL.—40s. per lb.
SAFROL—1s. 6d. per lb.
VANILLIN, EX CLOVE OIL.—14s. 6d. to 16s. 6d. per lb. Ex Guaiacol.—13s. to 15s. per lb.

Essential Oils

ANISE OIL.—2s. 6d. per lb.
BERGAMOT OIL.—9s. per lb.
BOURBON GERANIUM OIL.—17s. per lb.
CAMPHOR OIL.—White, 2s. per lb.; Brown, 1s. 6d. per lb.
CANANGA.—Java, 8s. per lb.
CINNAMON OIL LEAF.—5s. per oz.
CITRONELLA OIL.—Java, 2s. 3d. per lb., c.i.f. Pure Ceylon, 2s. 1d. per lb.
CLOVE OIL, 90/92%.—7s. per lb.
EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%—1s. 7d. per lb.
LAVENDER OIL.—Mont Blanc, 38/40%, 8s. 6d. per lb.
PALMA ROSA.—9s. 6d. per lb.
PEPPERMINT OIL.—Wayne County, 8s. 9d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, April 23, 1931.

THE various chemicals have been in good demand during the current week and the improvement continues. Prices remain steady.

General Chemicals

ACETONE is unchanged, with a satisfactory demand at £60-£63 per ton, according to quantity.

ACID ACETIC is in steady demand at £36 5s. to £38 5s. per ton for technical 80% and £37 5s. to £39 5s. per ton for pure 80%.

ACID CITRIC remains still quiet at 1s. 1d. per lb., less 5%.

ACID FORMIC 85%.—£38 per ton with a regular call.

ACID LACTIC is unchanged at £39-£40 per ton for the 50% by weight, pale quality.

ACID OXALIC.—The demand is improving at £30 7s. 6d. to £32 per ton, according to quantity.

ACID TARTARIC continues slow at about 11½d. to 1s. per lb., less 5%.

ALUMINA SULPHATE.—Unchanged at £7 15s. to £8 5s. per ton for the 17/18% iron free quality.

ARSENIC is unchanged at £19 to £19 10s. per ton.

BARIUM CHLORIDE continues steady at £9 10s. to £10 per ton, with a fair demand.

CREAM OF TARTAR is in regular demand at 82s. to 83s. per cwt., ex warehouse London.

COPPER SULPHATE.—Steady at £22 to £22 10s. per ton, less 5%, free on rails London, and in good demand.

FORMALDEHYDE.—£30 to £30 10s. per ton, and in good request.

LEAD ACETATE is lower at £32 5s. per ton for white, and £1 per ton less for brown.

LEAD NITRATE.—About £29 10s. per ton.

LITHOPONE is unchanged at £18 to £22 per ton, according to grade and quantity.

POTASSIUM BICHROMATE.—Firm at 4¼d. per lb.

CHLORATE OF POTASH.—Firm at £28-£32 per ton.

PERMANGANATE OF POTASH.—In steady demand at 5¼d. to 5½d. per lb., ex wharf London.

SODA BICHROMATE is in steady request and firm at 3½d. per lb.

SODA CHLORATE continues very firm at £26 10s. per ton.

SODA HYPOSULPHITE.—Photographic crystals £14 5s. per ton and in good demand. Commercial quality quiet at about £8 10s. per ton.

SODA PRUSSIATE.—Firm at 4¾d. to 5¼d. per lb.

TARTAR EMETIC.—Steady, with a little better demand at 10¾d. per lb.

ZINC SULPHATE is firm at £11 to £11 10s. per ton.

Coal Tar Products

THE market for coal tar products remains quiet, and prices are unchanged from last week.

MOTOR BENZOL remains at 1s. 4½d. to 1s. 5½d. per gallon, f.o.r.

SOLVENT NAPHTHA is obtainable at 1s. 1½d. to 1s. 2d. per gallon, f.o.r.

HEAVY NAPHTHA is unchanged, at 11d. to 1s. 0½d. per gallon, f.o.r.

CREOSOTE OIL is quoted at about 3d. to 3½d. per gallon, f.o.r. in the North, and at 4d. to 4½d. per gallon in London.

CRESYLIC ACID remains at about 1s. 8d. per gallon for the 98/100% quality, and at about 1s. 6d. per gallon for the dark quality 95/97%.

NAPHTHALENES are unchanged, the firelighter quality being quoted at £3 10s. to £3 15s. per ton, the 74/76 quality at £4 to £4 5s. per ton, and the 76/78 quality at about £5 per ton.

PITCH is quoted at 37s. 6d. to 40s. per ton, f.o.b. East Coast port.

Nitrogen Fertilisers

Sulphate of Ammonia.—Export.—The market continues quiet with prices unchanged at £7 per ton, f.o.b. U.K. port in single bags for neutral quality 20·6% nitrogen. *Home.*—Considering the state of agriculture buying appears to be larger than expected.

Nitrate of Soda.—Good sales are reported in the home market.

Latest Oil Prices

LONDON, April 22.—LINSEED OIL was quiet and 5s. per ton lower. Spot, ex mill, £18 15s.; May, £17; May-August, £17 5s.; and September-December, £18 2s. 6d., naked. RAPE OIL was inactive. Crude, extracted, £30; technical, refined, £31 10s., naked, ex wharf, COTTON OIL was slow and occasionally 5s. lower. Egyptian, crude, £21 5s.; refined common edible, £25 10s.; and deodorised, £27 10s., naked, ex mill. TURPENTINE was weak at 1s. 3d. per cwt. decline. American, spot, 42s. taken, 42s. 3d. sellers; May-June, 42s. 9d., sellers.

HULL.—LINSEED OIL, naked, spot to August, closed at £17 10s.; September-December, £18. COTTON OIL, Egyptian, crude, spot, £21; edible, refined, spot, £23 10s.; technical, spot, £23 5s.; deodorised, £25 10s. CASTOR OIL, pharmacy, spot, 41s.; firsts, 36s.; seconds, 34s. (per cwt.). PALM KERNEL OIL, crude, naked, 5½ per cent., spot, £23 5s. GROUNDNUT OIL, crushed/extracted, spot, £25 10s.; deodorised, £29 10s. SOYA OIL, crushed/extracted, spot, £19; deodorised, £22 10s. RAPE OIL, crushed/extracted, spot, £29 10s.; refined, £31 10s. per ton. COD OIL, nominal, at 20s. per cwt. TURPENTINE, 46s. per cwt.

South Wales By-Products

COAL hydrogenation and the move of Imperial Chemical Industries is the topic of conversation in South Wales these days. Welsh coals, especially the highly bituminous coals known as Admiralty coals, are particularly suitable for the hydrogenation process and it is felt that it is in the direction of the extraction of oil fuel from coal that the industrial salvation of the Principality lies. The demand for pitch continues to be slow and there is no hope of improvement until there is a brighter outlook for patent fuel. There is no change in pitch quotations. There is a fair and steady call for road tar round about 13s. per 40-gallon barrel. The same remark applies to refined tars, with quotations for coke-oven and gasworks tar unchanged. There is a small demand for solvent naphtha, but heavy naphtha has practically no market. There is no change in values. Patent fuel prices, for export, are: 20s. 6d. to 21s., ex-ship Cardiff; 19s. 6d. to 20s., ex-ship Swansea. Coke prices are: Best foundry, 34s. to 36s. 6d.; good foundry, 22s. 6d. to 25s.; furnace, 16s. 6d. to 17s. 6d.

Scottish Coal Tar Products

SOME improvement is noticeable throughout, but prices of most products continue easy. Considerable business has been arranged in refined tars during the week, and the better grades of creosote have also been commanding attention.

Cresylic Acid.—Orders are more numerous, but prices remain easy. Pale, 99/100%, 1s. 5d. to 1s. 6d. per gallon; pale, 97/99%, 1s. 3d. to 1s. 4d. per gallon; dark, 97/99%, 1s. 2d. to 1s. 3d. per gallon; high boiling, 1s. 8d. to 1s. 9d. per gallon; all f.o.r., naked.

Carbolic Sixties.—With little or no business passing value is nominal at about 1s. 3d. to 1s. 5d. per gallon, ex works.

Creosote Oil has been in fair demand, but prices are unchanged. Specification oils, 2½d. to 3d. per gallon; gas works ordinary, 3½d. to 3¾d. per gallon; washed oil, 3d. to 3¼d. per gallon; all f.o.r., in buyers' rail tanks.

Coal Tar Pitch.—Dull, with export value nominal at 40s. per ton f.a.s. Glasgow. For home trade, 37s. 6d. to 40s. per ton, f.o.r. works, is quoted.

Blast Furnace Pitch is only in moderate call at 30s. per ton f.o.r. works for home trade, and 35s. per ton, f.a.s. Glasgow, for export.

Refined Coal Tar.—While prices remain easy trading is quite active. Quotations are from 2½d. to 2¾d. per gallon f.o.r. in buyers' packages.

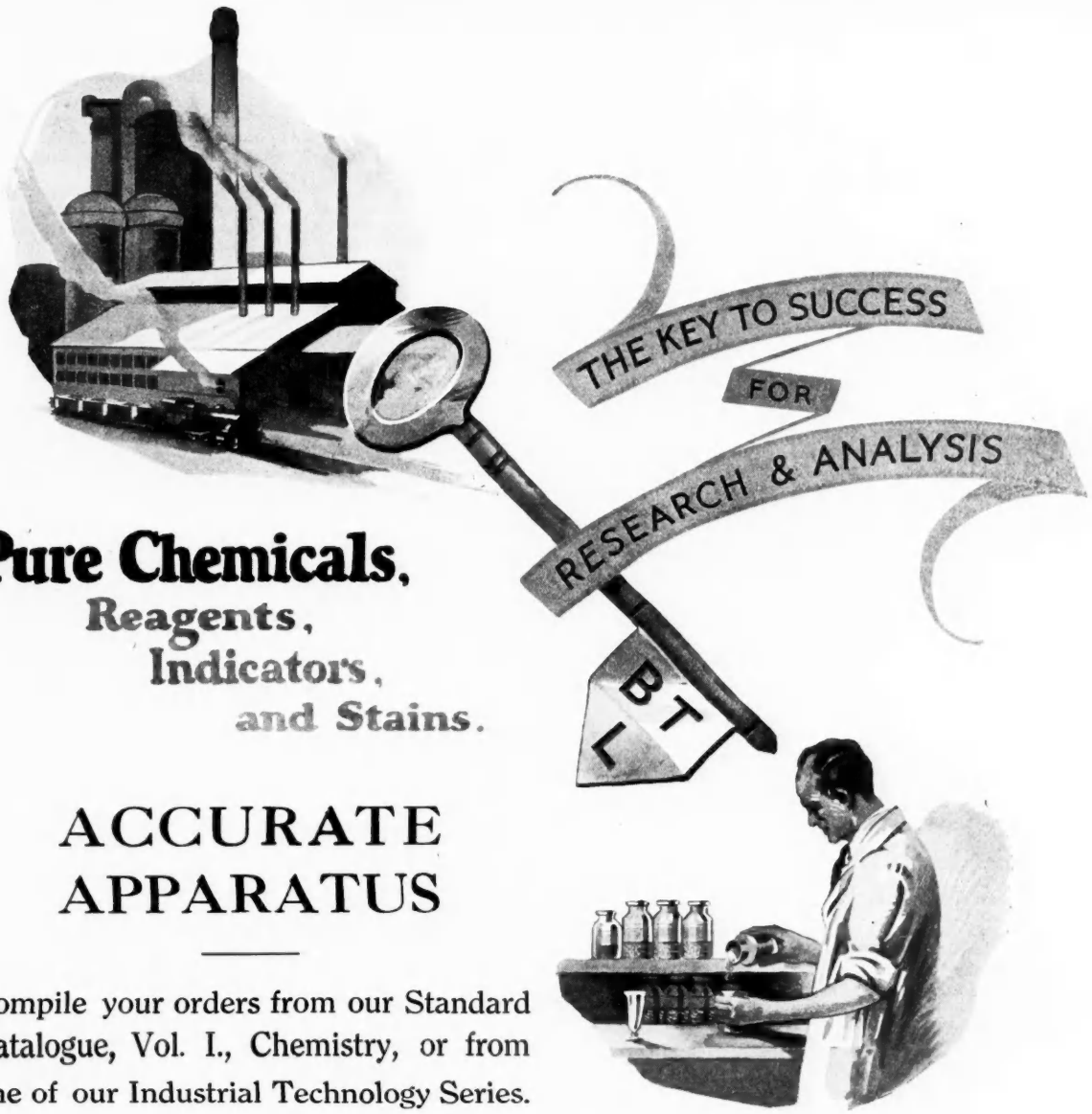
Blast Furnace Tar continues quiet at 2¾d. per gallon.

Crude Naphtha.—Value is steady at 4¼d. to 4½d. per gallon f.o.r. in bulk.

Water White Products.—Little business is being transacted, and quotations are weak. Motor benzol is 1s. 3d. to 1s. 4d. per gallon; 90/160 solvent, 1s. 2d. to 1s. 3d. per gallon; 90/190 heavy solvent, 1s. to 1s. 0½d. per gallon, all f.o.r. makers' works, in bulk.

British Chemical and Dyestuffs Traders

THE eighth annual general meeting of the British Chemical and Dyestuffs Traders' Association, Ltd., will be held at the Comedy Restaurant, Panton Street, London, S.W.1, on Wednesday, April 29, 1931, at 2.30 p.m. The following have been nominated for election to the various offices of the Association during the forthcoming year:—President, Mr. Victor Blagden; vice-presidents, Mr. Fredk. T. T. Reynolds, Mr. A. F. Butler; chairman, Mr. S. J. C. Mason; vice-chairman, Mr. Harold Gilliat (Leeds); hon. treasurer, Mr. H. A. Berens; hon. auditor, Mr. A. Hughes; executive council, Mr. Wm. Mann (Produce Merchants, Ltd., London), Mr. W. Beckley (Chas. Zimmermann and Co. (Chemicals) Ltd., London).



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Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.*

Glasgow, April 21, 1931.

INQUIRIES have been brisk during the past week, and business in the Scottish heavy chemical market continues to be steady.

Industrial Chemicals

ACETONE.—B.G.S.—£60 to £63 per ton, ex wharf, according to quantity.

ACID, ACETIC.—Prices ruling are as follows: glacial, 98/100%, £47 to £58 per ton; pure, £37 5s. per ton; technical, 80%, £36 5s., delivered in minimum lots of 1 ton.

ACID, BORIC.—Granulated commercial, £22 per ton; crystals, £23 per ton; B.P. crystals, £31 per ton; B.P. powder, £32 per ton, in 1-cwt. bags, delivered Great Britain free in one-ton lots upwards.

ACID, HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. per carboy, ex works, full wagon loads.

ACID, NITRIC, 80° QUALITY.—£23 per ton, ex station, full truck loads.

ACID, OXALIC.—98/100%.—On offer at the same price, viz.: 3¼d. per lb., ex store. On offer from the Continent at 3¼d. per lb., ex wharf.

ACID, SULPHURIC.—£3 7s. 6d. per ton, ex works, for 144° quality; £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID, TARTARIC, B.P. CRYSTALS.—Quoted 11½d. per lb., less 5%, ex wharf. On offer for prompt delivery from the Continent at 11¾d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted round about £8 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 10s. per ton., c.i.f. U.K. ports. Crystal meal, about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 10½d. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 80°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Spot material obtainable at round about £26 per ton, ex wharf. On offer for shipment from China at about £25 per ton, c.i.f. U.K.

ARSENIC, WHITE POWDERED.—Quoted £22 10s. per ton, ex wharf. Spot material still on offer at £22 15s. per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £9 10s. per ton, c.i.f. U.K. ports. For Continental materials our price would be £8 10s. per ton, f.o.b. Antwerp or Rotterdam.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 15s. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. to £5 5s. per ton, according to quantity and point of delivery. Continental material on offer at £4 7s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—At about £3 15s. per ton, f.o.r. works, or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Now quoted £30 10s. per ton, ex store. Continental on offer at about £20 per ton, ex wharf.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 per ton, ex wharf.

LEAD, RED.—Price now £32 per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £42 per ton, carriage paid.

LEAD ACETATE.—White crystals quoted round about £34 to £35 per ton c.i.f. U.K. ports. Brown on offer at about £1 per ton less.

MAGNESITE, GROUND CALCINED.—Quoted £9 7s. 6d. per ton, ex store.

METHYLATED SPIRIT.—Industrial quality 64 o.p. quoted 1s. 8d. per gallon, less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4¼d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer, £25 10s. per ton ex store. Offered from the Continent at £24 15s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99¾/100% POWDER.—Quoted £29 per ton ex store; crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £20 17s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5½d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb. ex store. Offered for prompt delivery from the Continent at about 6¾d. per lb. ex wharf.

SODA CAUSTIC.—Powdered 98/99%, £17 10s. per ton in drums, £18 15s. in casks. Solid 76/77% £14 10s. per ton in drums, £14 12s. 6d. per ton for 70/72% in drums; all carriage paid buyer's station, minimum four-ton lots; for contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3¾d. per lb., delivered buyer's premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 7s. 6d. per ton extra. Light soda ash, £7 13s. per ton, ex quay, minimum four-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 2s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £15 per ton, ex station, minimum four-ton lots.

SODIUM NITRATE.—Chilean producers now offer at £10 per ton, carriage paid, buyer's sidings, minimum six-ton lots.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf, to come forward.

SODIUM SULPHATE (SALTCAKE).—Price, 60s. per ton, ex works; 65s. per ton, delivered, for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid 61/62%, £10 per ton; broken, 60/62%, £11 per ton; crystals 30/32%, £8 2s. 6d. per ton, delivered buyers' works on contract, minimum four-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £9 5s. per ton; ground American, £8 10s. per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £19 per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Chemicals in the Irish Free State

Census of Production Statistics

ACCORDING to statistics which have now been published relating to the fertiliser, chemical, drug and paint industries of the Irish Free State in 1929, eleven establishments were engaged in the manufaccture of fertilisers, and at twenty-one establishments chemicals, drugs and paints were made.

The net selling value of the products manufactured in 1929 by the fertiliser establishments was £575,770, as against £541,601 in 1926. Of this amount superphosphates and compound manures accounted for £487,987. The cost of materials used was £363,612, as compared with £377,597 in 1926. This included cost of ingredients, £287,953; fuel, £16,420; and sacks, bags, etc., £59,239. The net output of the fertiliser industry was, therefore, £212,158, as against £164,004 in 1926.

The net selling value of the products from establishments manufacturing chemicals, drugs and paints was £156,071, as against £147,289 in 1926. This total included chemicals and drugs (disinfectants, weed-killers, insecticides and sheep and cattle dressings) to the amount of £7,930; drugs, medicines and medicinal preparations (galenical preparations, £25,257; proprietary medicines, £20,692; oils and tallow, £18,431; other drugs, medicines, ointments, etc., £11,527; and other chemicals, £9,229); paints and varnishes (paints in paste or mixed for use), £38,207; varnish, oil or spirit, £15,978; and writing ink, £1,598. Here the cost of materials used was £90,866 (against £77,772 in 1926), and included oils, crude and refined, £20,272; crude chemicals, £18,521; spirits of wine and other spirits, £12,558; bags, cases, tins, etc., £16,321. The net output of the chemical, drug and paint industry was, therefore, £65,205, as against £69,517 in 1926.

The numbers of persons employed in the fertiliser and the chemical, drug and paint industries during the week ended October 19, 1929, was 1,079. The total amount paid in salaries and wages during 1929 was £169,167.

Copies of this report can be obtained from the Statistics Branch of the Department of Industry and Commerce, Lower Castle Yard (South), Dublin.

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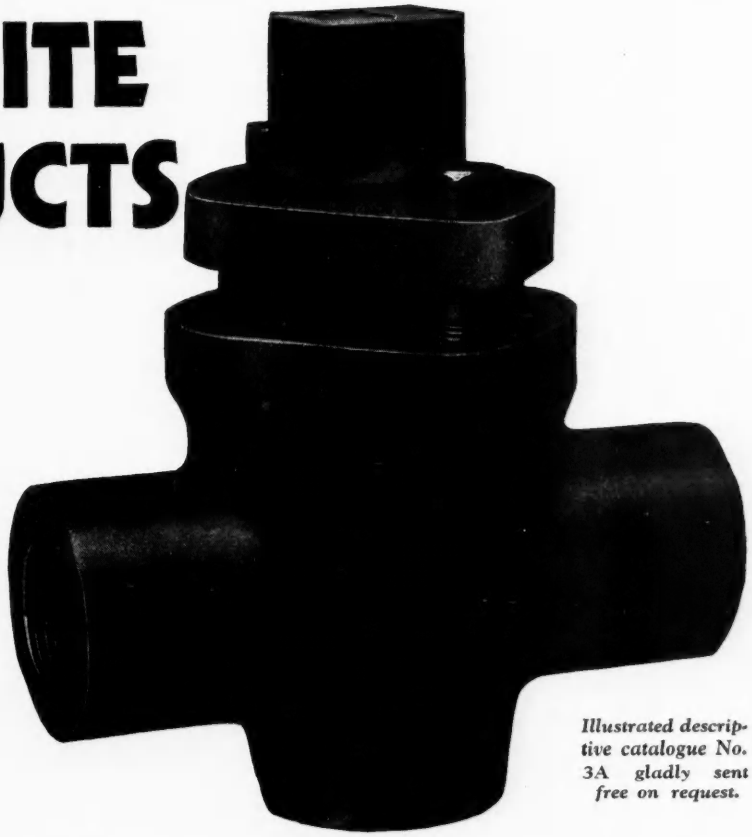

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Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, April 23, 1931.

Chemical traders on this market find considerable difficulty in forcing an expansion of business much above the level generally experienced since the Easter holidays, although, on the whole, there seems still to be a somewhat better movement of the heavy products in the aggregate to textile finishing works concerned with the cotton and woollen industries. Most of this business, however, is against contracts, the reports during the past week as to new commitments agree that transactions tend to be restricted to small to medium parcels for delivery over short periods.

Heavy Chemicals

Buying interest in the case of sulphide of sodium has been rather quiet about at round £9 10s. per ton for the 60/65 per cent. concentrated solid quality and £8 for the commercial grade values have shown little further change on balance. With regard to prussiate of soda a moderate inquiry has been met with and prices are firm at from 4¾d. to 5¼d. per lb., according to quality. Chlorate of soda is steady in the neighbourhood of £27 per ton, business this week having been on the slow side. There is a quiet demand about in the case of dibasic phosphate of soda, offers of which are at about £10 10s. per ton. Alkali is in moderate request and quotations are steady at about £6 per ton. There is a continued fair movement of caustic soda at firm prices, the basis of contract commitments ranging from £12 15s. to £14 per ton, according to grade. Bichromate of soda meets with a quietly steady call and offers of this material are well held at 3½d. per lb., less 1 to 2½ per cent. Saltcake is currently quoted at up to £3 per ton, with no big weight of business reported on this centre. Bicarbonate of soda is firm at £10 10s. per ton, with buying interest in this section on moderate lines. The demand for hyposulphite of soda has been quiet this week but prices are held at about £9 per ton for the commercial quality and £15 5s. for the photographic quality.

In the potash section, yellow prussiate meets with a moderate inquiry and prices keep up at from 6¾d. to 7¼d. per lb., according to quantity. Bichromate of potash is in quietly steady demand on the basis of 4¼d. per lb., less discounts of from 1 to 2½ per cent. according to quantity. Only a quiet business is going through in permanganate of potash, with the commercial quality on offer at about 5¼d. per lb. and the B.P. at 5½d. A moderate trade is being done in carbonate of potash, which keeps steady at round £25 per ton. Caustic potash is currently quoted at up to £29 per ton. Chlorate of potash is steady at £27 10s. per ton, with sales on rather a quiet scale.

Sulphate of copper is weak and uncertain with regard to prices, and business is quiet; values are at round £20 per ton, f.o.b. Arsenic, however, is steady at £19 5s. per ton at the mines, for white powdered, Cornish makes, the demand for this material being moderate. The acetates of lime are inactive and these are one of the few weak sections of the market, offers being down to about £12 10s. per ton for the grey quality and £7 to £7 5s. for the brown. The lead compounds meet only with a quiet demand; nitrate is on offer at about £29 per ton, and white and brown acetate at £33 and £32 respectively.

Acids and Tar Products

There is a moderate movement of acetic acid at firm prices, the glacial technical quality being quoted at £51 per ton and the commercial 80 per cent. at round £37. Oxalic acid is steady and in quiet demand at £1 12s. per cwt., ex store. Not much business is offering in the case of tartaric acid, although at about 11½d. per lb. prices show little change. Citric acid is on the slow side at 1s. 0½d. per lb.

The by-products are mostly in quiet demand, with pitch prices largely nominal at 37s. per ton, f.o.b. Creosote oil tends easy at from 3d. to 4d. per gallon, naked, at works, according to quality. Solvent naphtha is steady at the moment at round 1s. 2d. per gallon, with carbolic acid on offer at 5½d. per lb., f.o.b., for crystals, and round 1s. 2d. per gallon for crude 60's.

Company News

Weardale Lead Co.—The directors report that in consequence of the low prices of lead, operations do not warrant declaration of an interim dividend.

Bryant and May, Ltd.—A final dividend of 4 per cent., tax free, is announced on the ordinary shares and 5 per cent., tax free, on the partnership shares, making, with the interims, 10 per cent., tax free, on each class.

British Alizarine Co., Ltd.—It is announced that the offer made by Imperial Chemical Industries, Ltd., for the shares of the British Alizarine Co., Ltd., has been accepted by over 98 der cent. of the shareholders.

Newton, Chambers and Co., Ltd.—The profits for the year amount to £46,295 and £59,283 was brought forward. A final dividend of 5 per cent., tax free, is recommended, making 7½ per cent. for the year, and £59,609 is carried forward.

British Oxygen Co., Ltd.—A profit of £61,900 is shown in the report for the nine months to December 31 last. A sum of £83,569 is placed to reserve, and after payment of the dividend of 6 per cent., there remains £76,861 to go forward.

Allen Liversidge, Ltd.—The accounts for the eight months ended December 31 last show a net profit of £34,167, to which is added a balance of £14,114 brought forward, making £48,281. The directors recommend a final dividend on the ordinary share of 2⅛ per cent., less tax, making 5¼ per cent. for the eight months, leaving to be carried forward £16,448.

British Drug Houses, Ltd.—The trading profit for 1930 amounted to £58,086, from which must be deducted amortisation of leaseholds and depreciation of plant, etc., directors' fees and tax, £18,084, leaving £40,002, to which is added amount brought forward, £10,428, making £50,430. The directors recommend a final dividend of 3 per cent. (making 5 per cent. for the year) on the ordinary shares, transferring to general reserve fund £10,000, leaving to be carried forward £8,330. The annual meeting will be held at the Midland Hotel, St. Pancras, on April 29, at 12 noon.

Babcock and Wilcox, Ltd.—A final dividend of 7 per cent., tax free, is recommended on the 4,299,656 £1 ordinary shares, making a total for 193 of 14 per cent., tax free. This represents a reduction of 1 per cent. from the payments of the three previous years. Lower profits are shown in the report for the year 1930. At £650,666, the manufacturing profit compares with £676,196, while interest and discount, etc., yielded £163,209, against £188,835. After deducting expenses, fees, and the amount reserved for taxation, there remains a net profit of £609,302, which is approximately £65,000 below last year's figure.

Whiting Substitute in Canada

Whiting and whiting substitutes are used by a wide variety of Canadian industries, entering largely as they do into the manufacture of putty, oilcloth, linoleum, cold-water paints, rubber goods, blackboard crayons, and scouring, cleansing and polishing mediums, such as hand soaps and metal polishes. They are also used for ceramic glazes and in the making of white-shoe paste, fireworks, certain inks and dyes, some kinds of picture moulding, and a number of other articles. One Canadian industry uses 250 tons of whiting and whiting substitute a month when working to capacity. Whiting is merely finely pulverised chalk. Whiting substitute is finely pulverised white limestone, marble, calcite, or fresh-water marl; it is also obtained as a by-product in the manufacture of caustic soda.

The manufacture of whiting substitute first came into prominence during the war when supplies of chalk whiting were difficult to obtain. Since then it has become an established commodity and is steadily finding an increased market. Recently a plant capable of producing 12,000 tons of whiting substitute annually has been established in Montreal.

Market for Carbon Tetrachloride in Canada

Of the 45,266 lb. of carbon tetrachloride exported from the United States during January, 1931, 43,275 lb. went to Canada. The latter country also received 81,650 lb. of carbon bisulphide from the total January exports which amounted to 86,721 lb.

VITREOSIL CONTAINERS

Improvements in manufacture have made possible the production of containers or reaction vessels of large size. The picture shows one of 108 gallons capacity. It is 4 ft. 6 in. in height overall, and 2 ft. 6 in. internal body diameter.

THE THERMAL SYNDICATE LTD.

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LONDON DEPOT: THERMAL HOUSE, OLD PYE STREET, S.W.1

New Chemical Trade Marks

Applications for Registration

These lists are specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to May 15, 1931.

ALOF.

520,649. Class 1. Chemical substances for treating water, to prevent corrosion in hot water systems. Agricultural Products, Ltd., 39, Victoria Street, London, S.W.1; manufacturers and merchants. February 25, 1931.

NESCAL.

520,650. Class 1. Chemical substances for treating water, to prevent corrosion in hot water systems. Agricultural Products, Ltd. February 25, 1931.

VULCACEL

520,044. Class 1. Chemical substances used in the manufacture of india-rubber. British Dyestuffs Corporation, Ltd., Hexagon House, Blackley, Manchester; manufacturers. February 3, 1931.

VULCAFLEX.

520,045. Class 1. Chemical substances used in the manufacture of india-rubber. British Dyestuffs Corporation, Ltd. February 3, 1931.

VULCATRIX.

520,047. Class 1. Chemical substances used in the manufacture of india-rubber. British Dyestuffs Corporation, Ltd. February 3, 1931.

TETRADOME.

520,322. Class 2. Chemical substances used for agricultural, horticultural, veterinary and sanitary purposes. The British Drug Houses, Ltd., 16 to 30, Graham Street, City Road, London, N.1; wholesale druggists. February 13, 1931. To be associated with No. 445,574 (2,401) iii, and others.

TETRADOME.

520,323. Class 3. Chemical substances prepared for use in medicine and pharmacy. The British Drug Houses, Ltd. February 13, 1931.

Chemical Trade Inquiries

These inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

PORTUGAL.—An inquiry has been received by the London Chamber of Commerce for a manufacturer or exporter of phosphorus sesquisulphide, manganese oxide, carbon bisulphide, potassium chlorate and other chemicals. (London Chamber of Commerce, Ref. No. 7,247.)

Tariff Changes

BRITISH INDIA.—The Indian Customs announce that the duty on imported foreign salt, not including Aden salt, was raised by 4½ annas per maund on March 18. The total duty payable on such salt is now, therefore, 1 rupee 8¼ annas per maund (82 lbs. avoirdupois).

LITHUANIA.—H.M. Consul at Kovno reports that certain modifications in the Lithuanian customs tariff affecting cement, petrol, kerosene, chemicals and oils, have been enforced as from March 29. A further notice on this subject will be published as soon as details are available.

New Chemical Works in China

ACCORDING to the *Chinese Economic Bulletin*, a group of Chinese capitalists are planning the establishment of a heavy chemical works at Shanghai, to be known as the Kai Cheng Heavy Chemical Works Co. Half-a-million dollars is to be raised for the capital of the projected company.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

ANCONA SULPHUR, LTD., London, E.C. (M., 25/4/31.) Registered April 14, £300 debentures part of £1,500; general charge.

BRITISH ALUMINIUM CO., LTD., London, E.C. (M., 25/4/31.) Registered April 11, debenture stock for £2,500,000 and any other stock issued not ex. in all £5,000,000 (secured by Trust Deed dated April 10, 1931), present issue £2,500,000; charged on properties in Staffs., Lancs., Northern Ireland and Scotland, also general charge. *£1,252,815. April 11, 1930.

BLEACHERS' ASSOCIATION, LTD., Manchester. (M., 25/4/31.) Registered March 31, £131,000 mortgage, to Refuge Assurance Co., Ltd., Manchester; charged on Blackfriars House, Parsonage, Manchester. *£2,250,000. July 4, 1930.

Satisfaction

ALUMINIUM CORPORATION, LTD., London, S.W. (M.S., 25/4/31.) Satisfaction registered April 10, £575, registered April 22, 1918.

New Companies Registered

KAYDOR, LTD., 30, Howland Street, London, W.1. Registered April 15. Nominal capital, £1,000 in £1 shares. Manufacturing chemists, manufacturers of chemists' sundries, druggists, drysalters, oil and colourmen, etc. Directors: M. Dor, L. Katzenstein.

STOURBRIDGE COAL AND FIRE CLAYS, LTD., Yew Tree Hills Colliery, Netherton, Dudley. Registered April 18. Nominal capital, £1,000 in £1 shares. To acquire, work and develop any collieries, quarries or ironworks, brickworks, patent fuel works, and iron and all kinds of metalliferous and chemical ore and other mines, and to carry on the business of winners and workers of coal, fireclay, ironstone, clay, gravel, stone, slate, limestone, freestone and other minerals, etc.

Cosach Scheme

MEETINGS of the debenture holders in the Compania Chilena de Salitres, the Compania Salitrera Galicia and the Loa Nitrate Co., Ltd., were held on Monday, April 20, at Winchester House, E.C., to consider resolutions sanctioning the sale of the undertakings and assets of the three companies to the Compania de Salitre de Chile (Cosach). At each meeting the chair was taken by Mr. S. R. Ireland, who was nominated by the trustees for the debenture holders, and the proceedings were of a formal character.

At the meeting of the Chilena Co. a debenture holder asked whether it was correct that the debenture holders were to forfeit the interest due for the last eighteen months. The chairman replied that that was part of the agreement. In reply to a further question, the chairman pointed out that Cosach would be responsible for the repayment of the debentures and for the interest upon them, with the exception of the arrears.

At each meeting the resolution was carried by the requisite majority.

Nickel Production in Canada

THE Dominion Bureau of Statistics at Ottawa reports that Canada's nickel output last year was slightly under that for 1929. Nickel in matte and speiss exported amounted to 41,959,927 lbs.; refined and electrolytic nickel was 57,478,651 lbs.; nickel in the form of oxides and salts, 4,330,279 lbs., giving a total production of 103,768,857 lbs., valued at $24,455,133.